

**PROCESSED CSMIP STRONG-MOTION RECORDS FROM  
THE NORTHRIDGE, CALIFORNIA EARTHQUAKE  
OF JANUARY 17 1994: RELEASE NO. 3**

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## INTRODUCTION

The digitized and processed records obtained from 7 CSMIP stations during the Northridge earthquake of January 17, 1994 are included in this third release. The stations range in distance from 18 to 58 km (epicentral). The stations are:

• Pacoima - Kagel Canyon	Sta. # 24088, 18 km
• Century City - LACC North	Sta. # 24389, 20 km
• Malibu - Point Dume	Sta. # 24396, 32 km
• Moorpark	Sta. # 24283, 33 km
• San Marino - Southwestern Academy	Sta. # 24401, 39 km
• Downey - County Maint. Bldg.	Sta. # 24368, 47 km
• Long Beach - City Hall Grounds	Sta. # 14560, 58 km

Strong-motion records were recovered from 193 CSMIP stations following the Northridge earthquake. The accelerograms, information on the earthquake and recording stations are presented in the CSMIP data report on this earthquake (Shakal and others, 1994). The results of digitizing and processing for the first release of 5 records were announced on February 4, 1994 and were included in the first release report (Darragh and others, 1994a). The results of digitizing and processing for the second release of 5 records were announced on February 24, 1994 and were included in the second release report (Darragh and others, 1994b). Details on accelerogram digitizing and processing will be presented in a forthcoming final CSMIP processed data report.

Table 1 summarizes the ground motion results for the 17 stations included in the first, second and third release reports. The coordinates, site characteristics, epicentral distance and maximum values of ground motion are given for each station in this table. Table 1 also lists the Usable Data Bandwidth.

## PLOTS OF PROCESSED DATA

For each ground-response station the plots are numbered in the upper right corner of each page. The first page for each station is given below as:

<u>Page No.</u>	<u>Station Name</u>
9	Pacoima - Kagel Canyon
19	Century City - LACC North
29	Malibu - Point Dume
39	Moorpark
49	San Marino - Southwestern Academy
59	Downey - County Maint. Bldg.
69	Long Beach - City Hall Grounds

The order of the plots for each station is as follows:

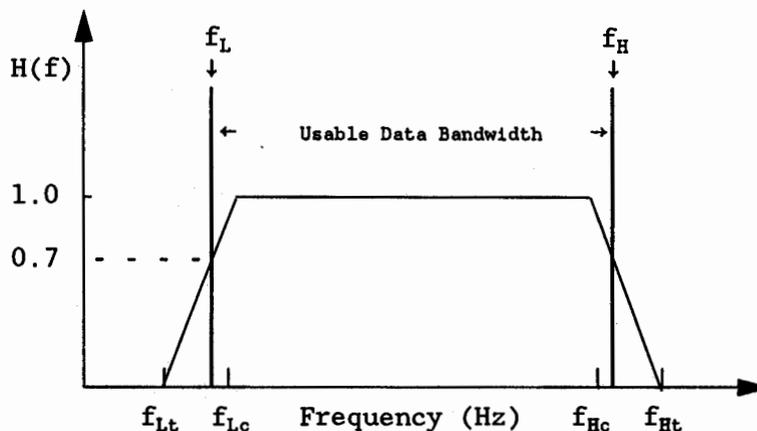
1. Phase 1 (Vol. 1) data: Uncorrected accelerations. Acceleration for the first 22 seconds is plotted with a common scaling factor for all channels; three channels are plotted on one page. This plot is followed by a second plot of the full processed length (60 seconds) with each channel individually scaled.
2. Phase 2 (Vol. 2) data: Instrument and baseline-corrected acceleration, velocity and displacement. The data for the full processed length (60 seconds) are plotted with equal scaling for all channels. The filter frequencies determined in the processing are indicated on the plots (see Usable Data Bandwidth).
3. Phase 3 (Vol. 3) data: Response spectra. The pseudo-velocity spectra (PSV), the pseudo-acceleration spectra (PSA), the displacement spectra (SD) and the Fourier amplitude spectra (FS) are presented on a tripartite logarithmic plot for each channel for 0%, 2%, 5%, 10%, and 20% dampings. The spectra are plotted for periods within the Usable Data Bandwidth.
4. Phase 3 (Vol. 3) data: Response spectra. The absolute acceleration spectra (SA) for 0%, 2%, 5%, 10% and 20% dampings are plotted against period with linear-linear scaling from 0 to 4 seconds.

#### REFERENCES

- Darragh, R., T. Cao, C. Cramer, M. Huang and A. Shakal (1994a). Processed CSMIP Strong-Motion Records from the Northridge, California Earthquake of January 17, 1994: Release No. 1, Calif. Dept. of Conservation, Div. Mines and Geology, Office of Strong Motion Studies, Report No. OSMS 94-06B, February 4, 1994, 48 p.
- Darragh, R., T. Cao, M. Huang and A. Shakal (1994b). Processed CSMIP Strong-Motion Records from the Northridge, California Earthquake of January 17, 1994: Release No. 2, Calif. Dept. of Conservation, Div. Mines and Geology, Office of Strong Motion Studies, Report No. OSMS 94-08, February 24, 1994, 48 p.
- Shakal, A., M. Huang, R. Darragh, T. Cao, R. Sherburne, P. Malhotra, C. Cramer, R. Sydnor, V. Graizer, G. Maldonado, C. Petersen and J. Wampole (1994). CSMIP Strong-Motion Records from the Northridge, California Earthquake of 17 January 1994, Calif. Dept. of Conservation, Div. Mines and Geology, Office of Strong Motion Studies, Report No. OSMS 94-07, February 18, 1994, 308 p.

### DEFINITION OF USABLE DATA BANDWIDTH

The filter bands for each record are indicated on the plots for the Phase 2 and Phase 3 data. In standard processing, the digitized data are processed and filtered using Ormsby filters. The data are first low-pass filtered using a high-frequency filter with a corner frequency of 23 Hz and a roll-off termination frequency of 25 Hz. Then the data are high-pass filtered using a low-frequency filter with a corner frequency of 0.07 Hz and a roll-off termination of 0.05 Hz. Therefore, the Phase 2 data is the result of the digitized data being filtered by the bandpass filter  $H(f)$  with ramps as shown in the figure:



The Usable Data Bandwidth is defined as the band between frequencies  $f_H$  and  $f_L$ , where  $f_H$  and  $f_L$  are the -3 dB points on the high-frequency and low-frequency ramps, respectively. The value of  $H(f)$  is approximately equal to 0.7 for -3 dB (see Notes). The user should only use these data for analyses within this bandwidth.

#### Notes:

- 1) The values of  $f_H$  and  $f_L$  can be calculated from the corner frequencies ( $f_{Hc}$ ,  $f_{Lc}$ ) and the roll-off termination frequencies ( $f_{Ht}$ ,  $f_{Lt}$ ) used in the processing by using the formulas  $f_H = f_{Hc} + 0.3 * (f_{Ht} - f_{Hc})$  and  $f_L = f_{Lc} - 0.3 * (f_{Lc} - f_{Lt})$ . For example, the Usable Data Bandwidth for data bandpass-filtered with ramps at 0.30 to 0.60 Hz and 23.0 to 25.0 Hz is 0.51 Hz to 23.6 Hz (0.042 to 2.0 seconds period).
- 2) It is common in signal processing to plot  $20 \log_{10}[H(f)]$  versus frequency, and express the ordinate value in decibels (abbreviated dB). Accordingly, 0 dB corresponds to a value of  $H(f)$  equal to 1; 20 dB is equivalent to  $H(f) = 10$ , and -20 dB corresponds to  $H(f) = 0.1$ . Thus, at the -3 dB frequency point, the amplitude of the transfer function,  $H(f)$  is reduced to 0.7, while the power transmitted by the filter,  $H^2(f)$ , is reduced to 0.5.

TABLE 1 - SUMMARY OF PROCESSED GROUND-RESPONSE RECORDS FROM

Station No.	Station Name	Station Coordinates		Site Geology	Instrument Housing *	Epicentral Dist. ** (km)
		N Lat.	W Long.			
24087	Arleta Nordhoff Ave Fire Station	34.236	118.439	Alluvium	1-story bldg.	10
24514	Sylmar County Hospital Parking Lot	34.326	118.444	Alluvium	Small 1-story bldg.	16
24088	Pacoima Kagel Canyon	34.288	118.375	Rock (sedimentary)	1-story bldg.	18
24207	Pacoima Dam Downstream	34.334	118.396	Metamorphic rock (diorite gneiss)	Instr. shltr. D	19
24389	Century City LACC North	34.063	118.418	Alluvium	Instr. shltr. H	20
24279	Newhall LA County Fire Station	34.390	118.530	Alluvium	1-story bldg.	20
24538	Santa Monica City Hall Grounds	34.011	118.490	Alluvium	Instr. shltr. H	23
24303	Los Angeles Hollywood Storage Bldg. Grounds	34.090	118.339	Deep alluvium	Instr. shltr. H	23
24157	Los Angeles Baldwin Hills	34.009	118.361	Thin fill and alluvium over rock (shale)	Instr. shltr. H	28
24396	Malibu Point Dume	34.013	118.800	Thin alluvium over rock (sedimentary)	1-story bldg.	32
24283	Moorpark	34.288	118.881	Alluvium	Small garage	33
24400	Los Angeles Obregon Park	34.037	118.178	Alluvium	1-story bldg.	39
24401	San Marino Southwestern Academy	34.115	118.130	Deep alluvium	1-story bldg.	39

## THE NORTHRIDGE EARTHQUAKE OF JANUARY 17, 1994

Station No.	Trigger Time #	Component	Peak Accel. (g) ##	Peak Velocity (cm/sec)	Peak Displ. (cm)	Usable Data Bandwidth
		Azimuth (deg.)				
24087	---	90	0.347	-40.4	8.9	0.10-23.6 Hz (0.04-9.80 sec)
		UP	-0.582	-17.5	-6.5	
		360	0.306	-23.3	8.3	
24514	31:00.4	90	0.608	-76.9	-15.2	0.10-23.6 Hz (0.04-9.80 sec)
		UP	0.578	18.6	7.6	
		360	0.892	-128.9	-32.5	
24088	30:59.5	90	0.304	-30.9	-10.6	0.12-23.6 Hz (0.04-8.40 sec)
		UP	0.192	14.2	-4.4	
		360	0.434	-50.9	6.6	
24207	---	265	0.446	30.6	-5.0	0.14-23.6 Hz (0.04-7.35 sec)
		UP	-0.195	16.1	-2.6	
		175	-0.419	44.7	-4.6	
24389	31:00.8	90	0.262	21.4	-6.0	0.12-23.6 Hz (0.04-8.40 sec)
		UP	-0.149	-8.7	-3.2	
		360	0.232	-25.1	6.0	
24279	31:00±	90	-0.610	-74.8	17.6	0.10-23.6 Hz (0.04-9.80 sec)
		UP	0.605	30.7	12.8	
		369	0.598	-94.7	30.5	
24538	31:02.9	90	-0.901	41.8	-14.3	0.12-23.6 Hz (0.04-8.40 sec)
		UP	-0.257	14.0	3.8	
		360	-0.414	24.9	6.5	
24303	---	90	0.233	-18.1	4.7	0.14-23.6 Hz (0.04-7.35 sec)
		UP	-0.184	-9.9	-2.4	
		360	-0.401	22.3	4.3	
24157	---	90	0.238	14.8	5.8	0.14-23.6 Hz (0.04-7.35 sec)
		UP	-0.097	-8.5	3.3	
		360	-0.176	17.5	-4.6	
24396	31:02.0	90	0.130	8.4	2.0	0.26-23.6 Hz (0.04-3.92 sec)
		UP	0.094	-4.3	1.0	
		360	0.101	9.2	-1.8	
24283	31:02.7	180	0.297	20.3	4.4	0.14-23.6 Hz (0.04-7.35 sec)
		UP	-0.151	6.5	-3.2	
		90	0.194	-20.4	4.0	
24400	31:04.8	90	0.358	14.5	-4.2	0.14-23.6 Hz (0.04-7.35 sec)
		UP	-0.115	4.3	-1.7	
		360	-0.424	-30.9	-2.6	
24401	31:04.5	90	0.126	-7.9	-1.0	0.26-23.6 Hz (0.04-3.92 sec)
		UP	0.094	3.6	0.6	
		360	0.156	6.4	-1.0	

TABLE 1 - SUMMARY OF PROCESSED GROUND-RESPONSE RECORDS FROM

Station No.	Station Name	Station Coordinates		Site Geology	Instrument Housing *	Epicentral Dist. ** (km)
		N Lat.	W Long.			
24278	Castaic Old Ridge Route	34.564	118.642	Sedimentary rock	1-story bldg.	41
14403	Los Angeles 116th St. School	33.929	118.260	Alluvium	1-story bldg.	41
14368	Downey County Maint. Bldg.	33.924	118.167	Deep alluvium	1-story bldg.	47
14560	Long Beach City Hall Grounds	33.768	118.196	Alluvium	Instr. shltr. H	58

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\* - Instrument shelter types:

Instr. shltr D - small metal box

Instr. shltr H - small fiberglass shelter

\*\* - Distance given relative to the epicenter at 34.209N, 118.541W.

## THE NORTHRIDGE EARTHQUAKE OF JANUARY 17, 1994 (continued)

Station No.	Trigger Time #	Component		Peak Accel. (g) ##	Peak Velocity (cm/sec)	Peak Displ. (cm)	Usable Data Bandwidth
		Azimuth (deg.)					
24278	31:03.4	90		0.582	-51.5	-8.5	0.10-23.6 Hz (0.04-9.80 sec)
		UP		0.223	12.2	-4.8	
		360		0.523	-52.6	-15.6	
14403	31:04.1	90		-0.200	15.6	-2.8	0.14-23.6 Hz (0.04-7.35 sec)
		UP		0.060	-2.8	-1.3	
		360		-0.143	-13.2	-2.6	
14368	---	90		-0.173	-9.7	-3.3	0.17-23.6 Hz (0.04-5.88 sec)
		UP		-0.139	3.5	-1.1	
		360		-0.223	12.7	1.9	
14560	31:10.3	90		0.039	-4.9	1.7	0.26-23.6 Hz (0.04-3.92 sec)
		UP		-0.024	-1.9	-0.7	
		360		-0.054	-4.0	0.9	

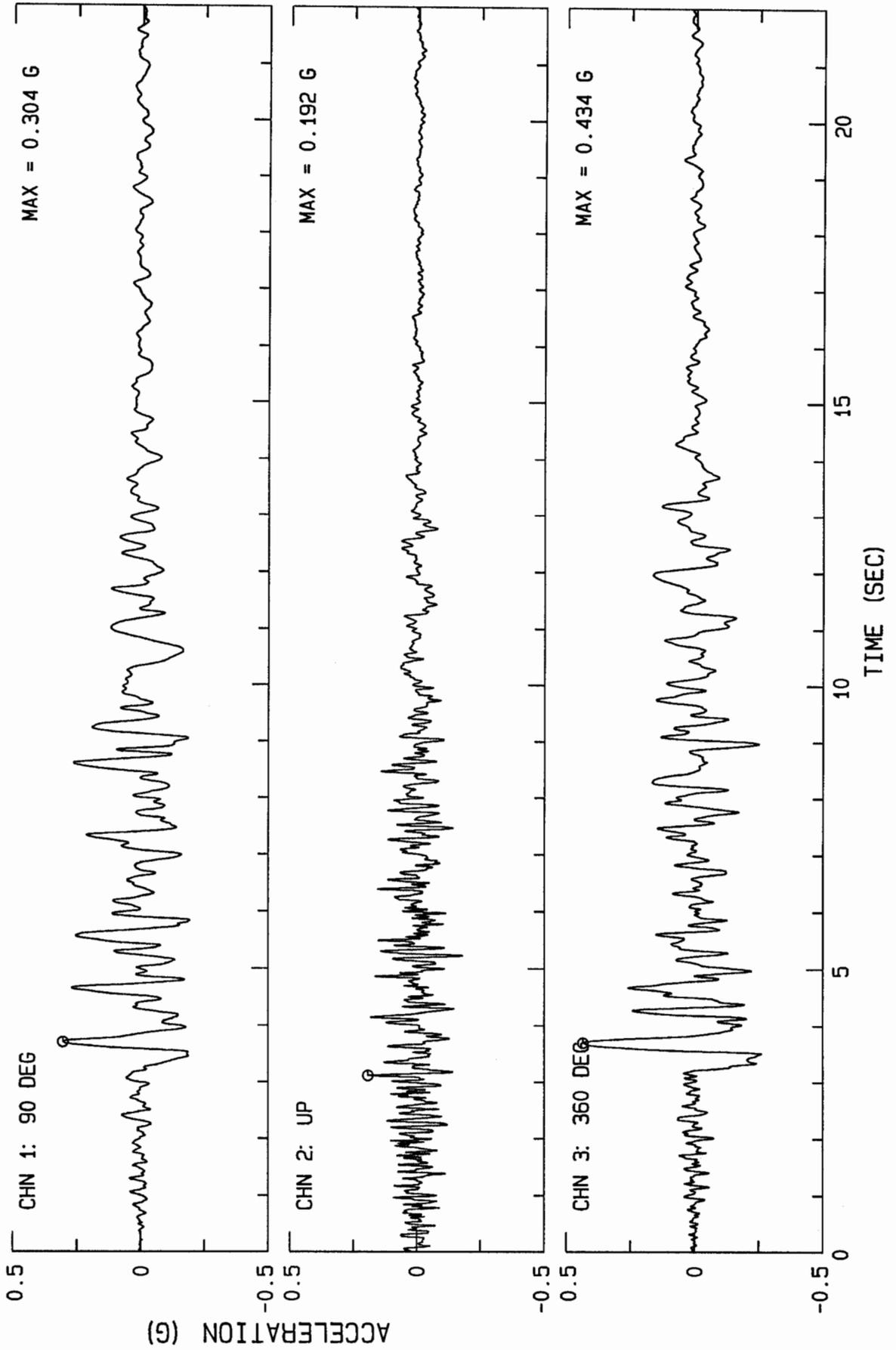
# Accelerograph trigger time, when present, in minutes and seconds after 12:00:00 UTC on 17 January 1994.

## Phase 1 (Volume 1) peak acceleration values.



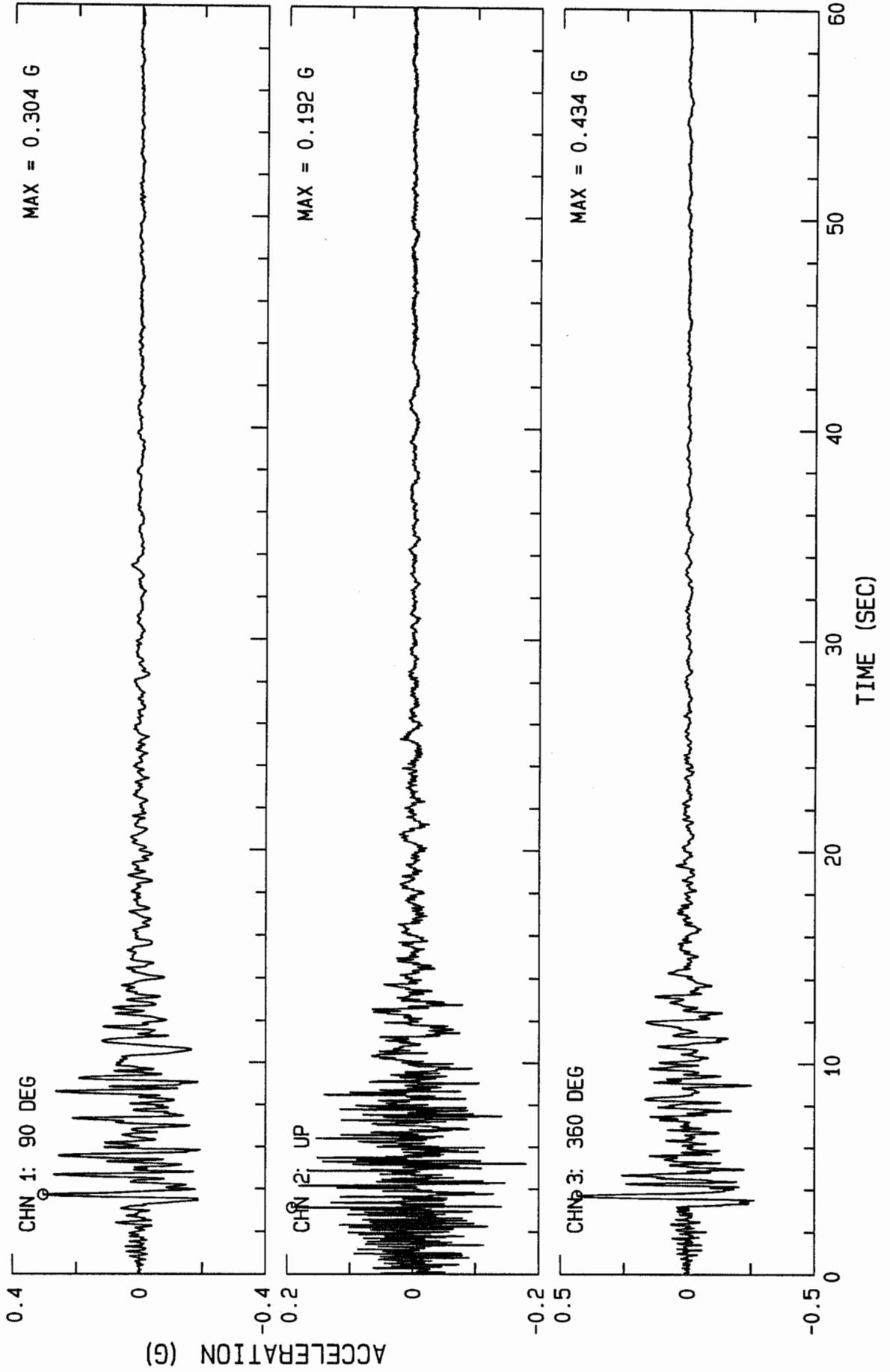
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PACOIMA - KAGEL CANYON

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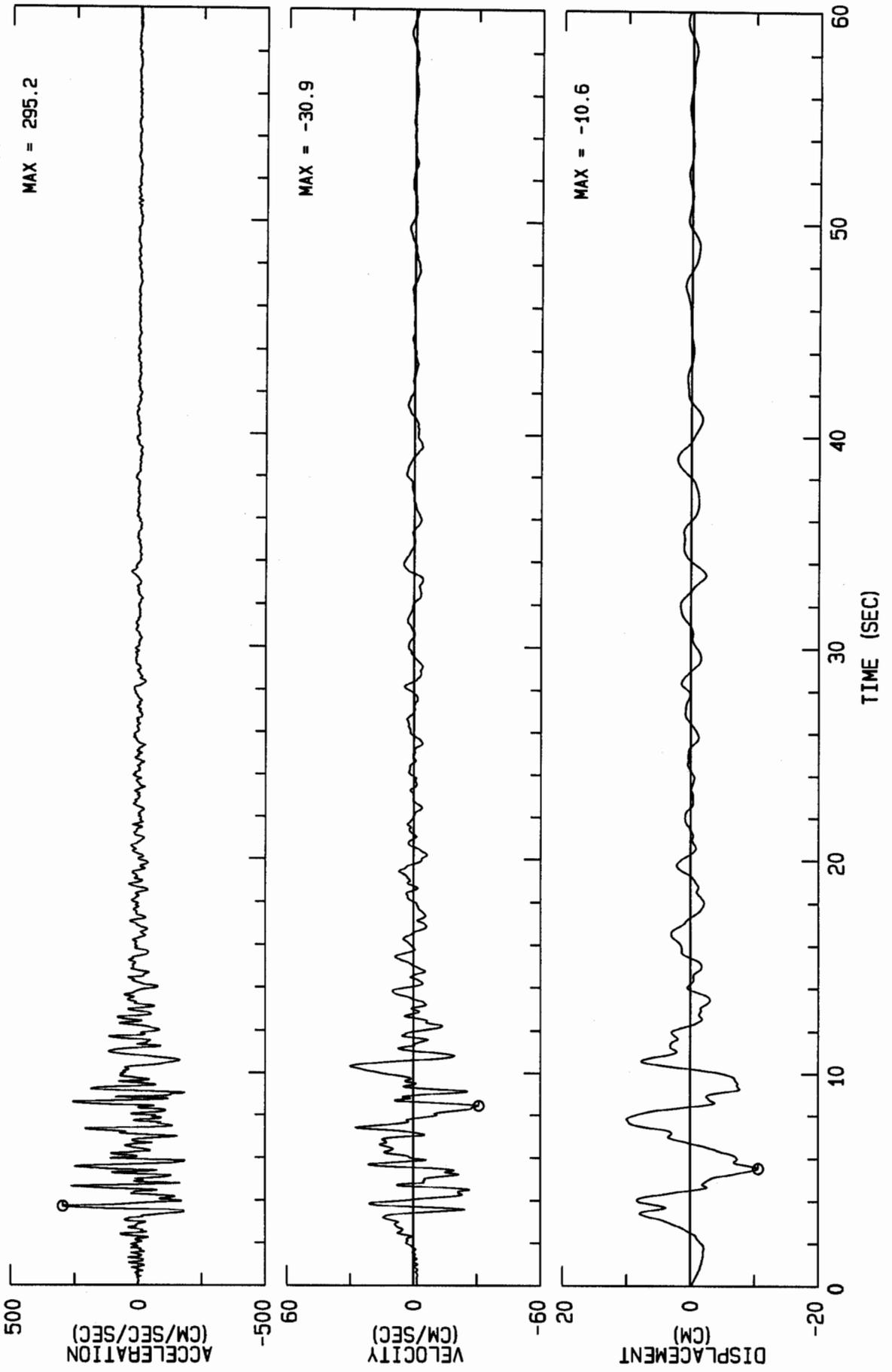


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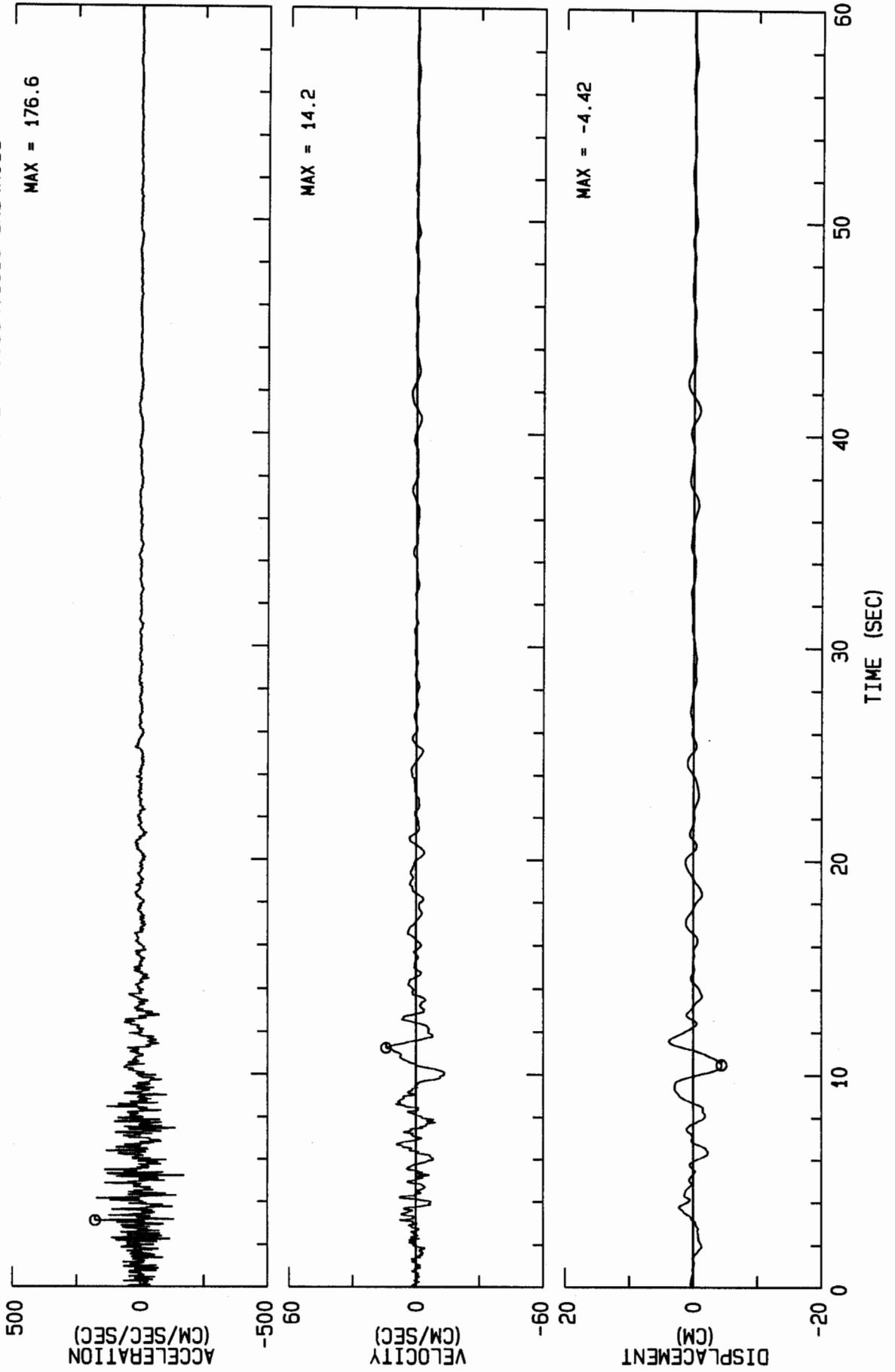
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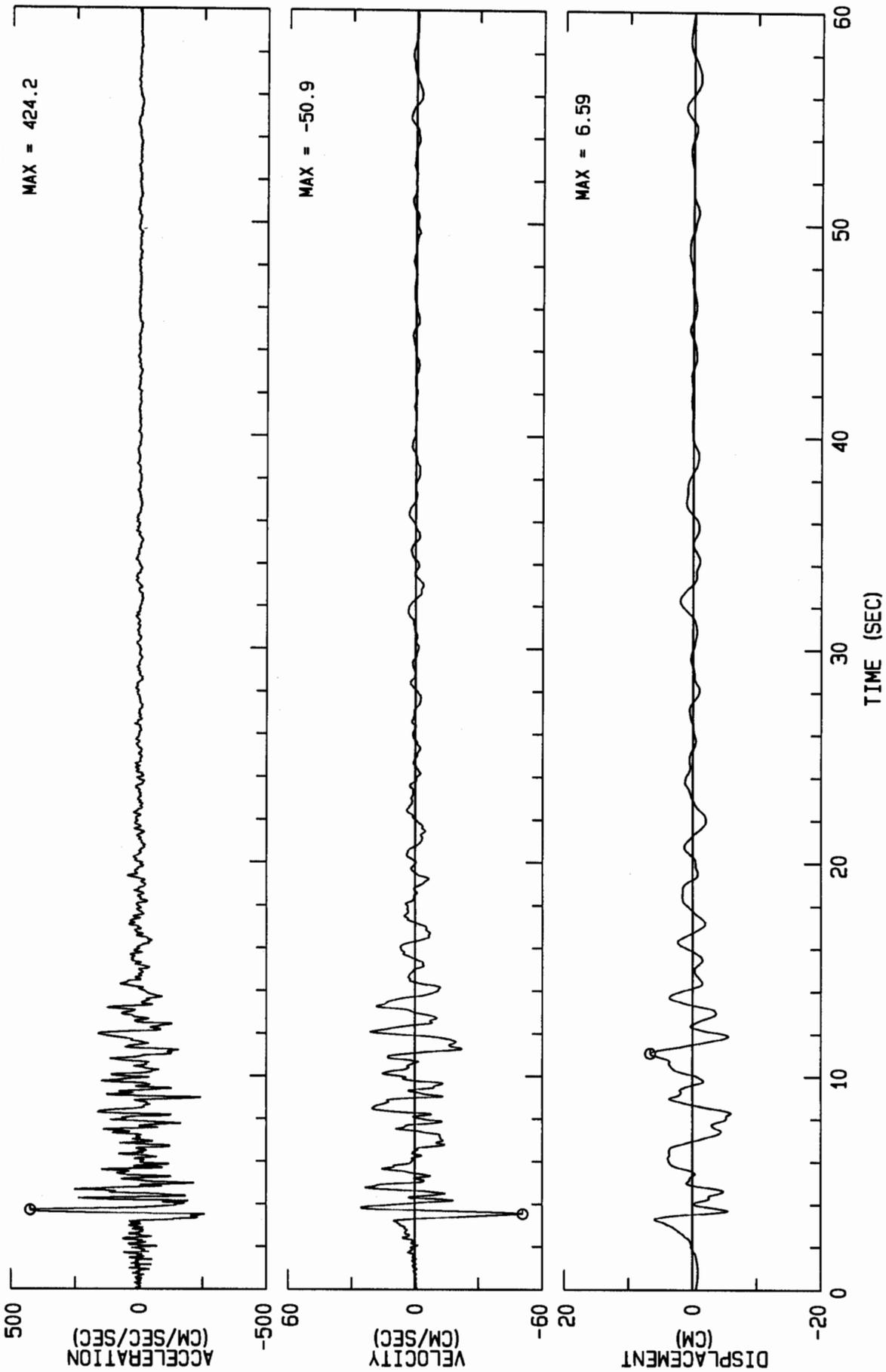
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INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
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NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
PACOIMA - KAGEL CANYON    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
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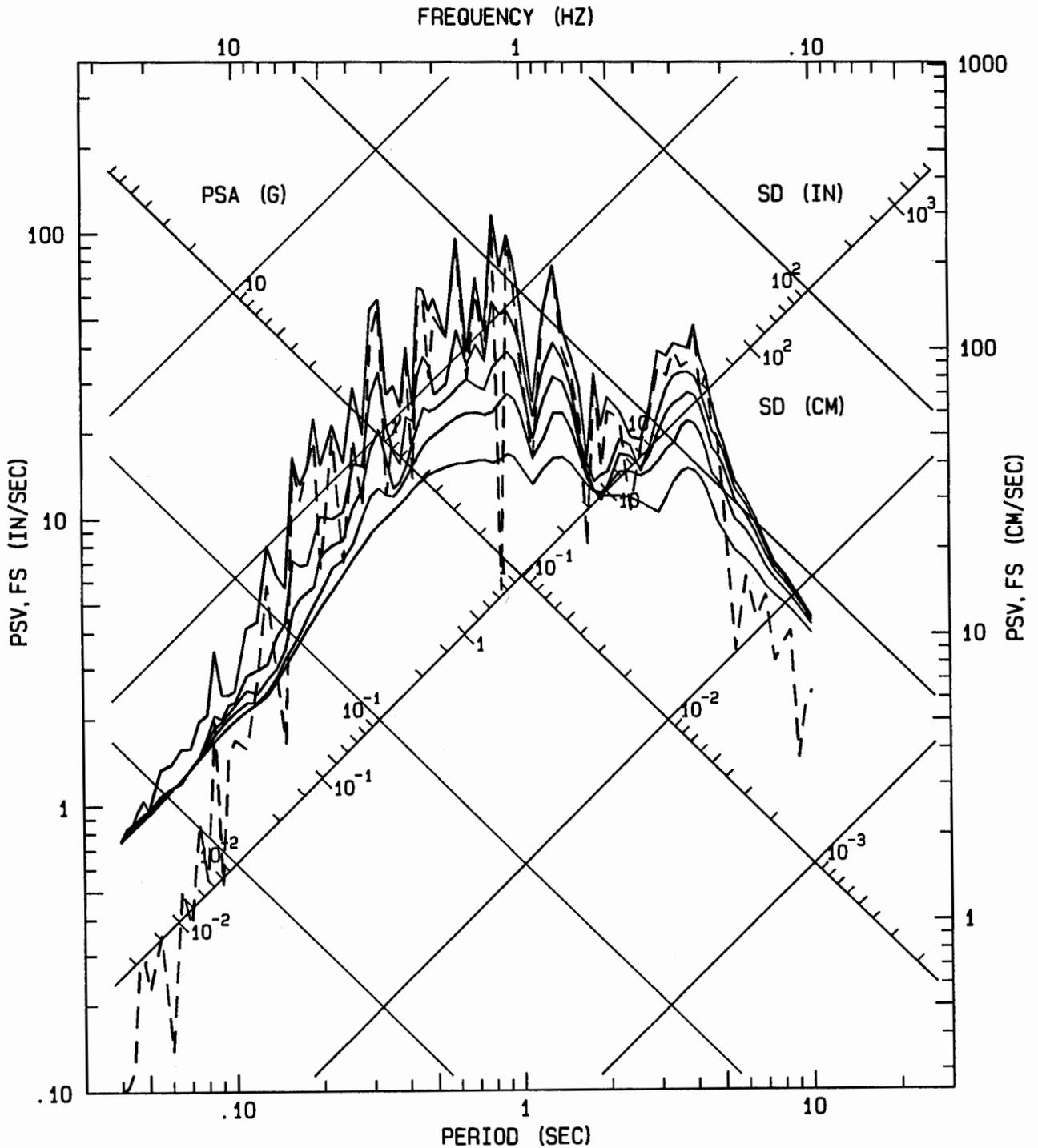
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NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 PACOIMA - KAGEL CANYON  
 CHN 1: 90 DEG

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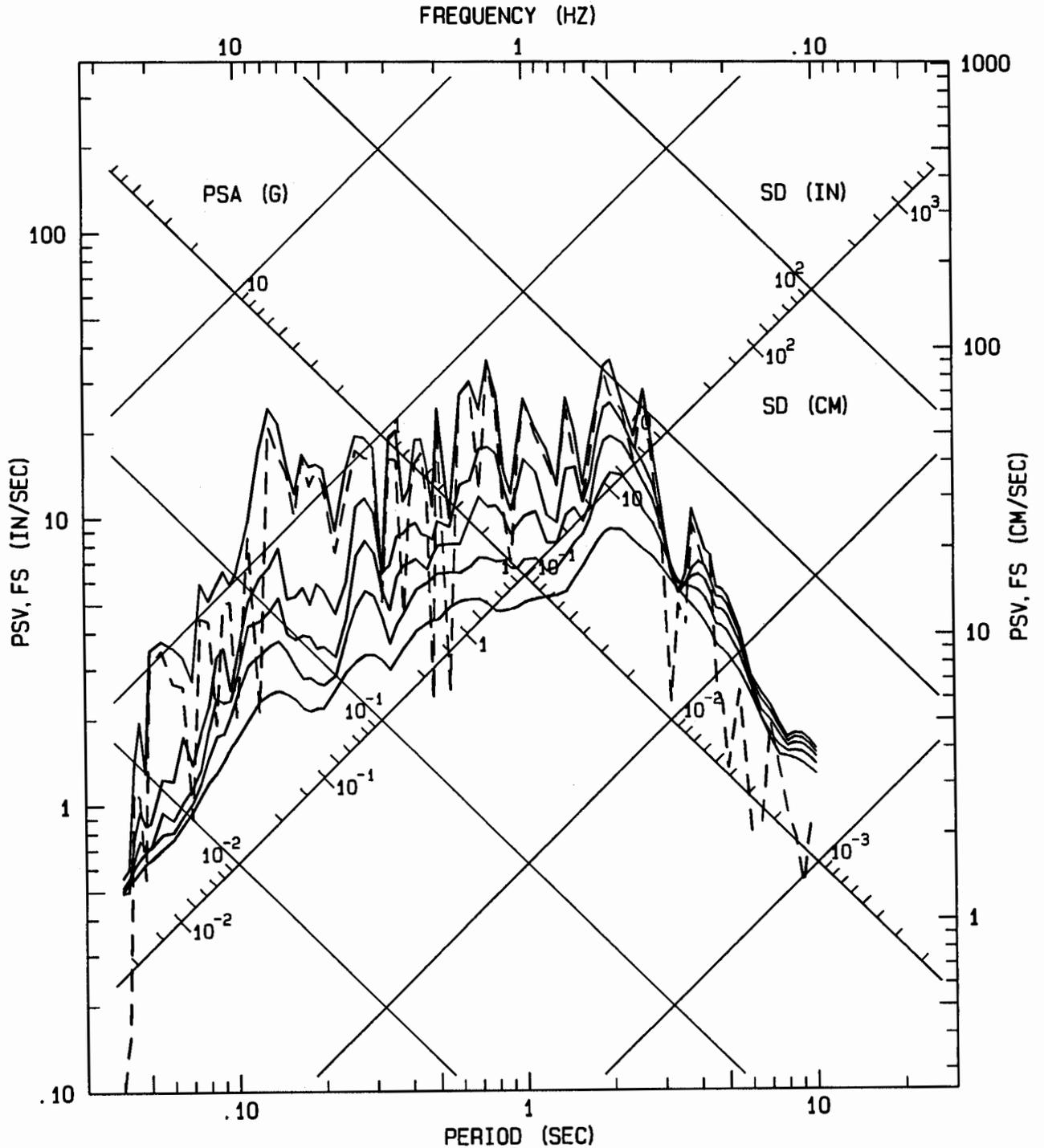
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NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
PACOIMA - KAGEL CANYON  
CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .07-.14 TO 23.0-25.0 HZ.  
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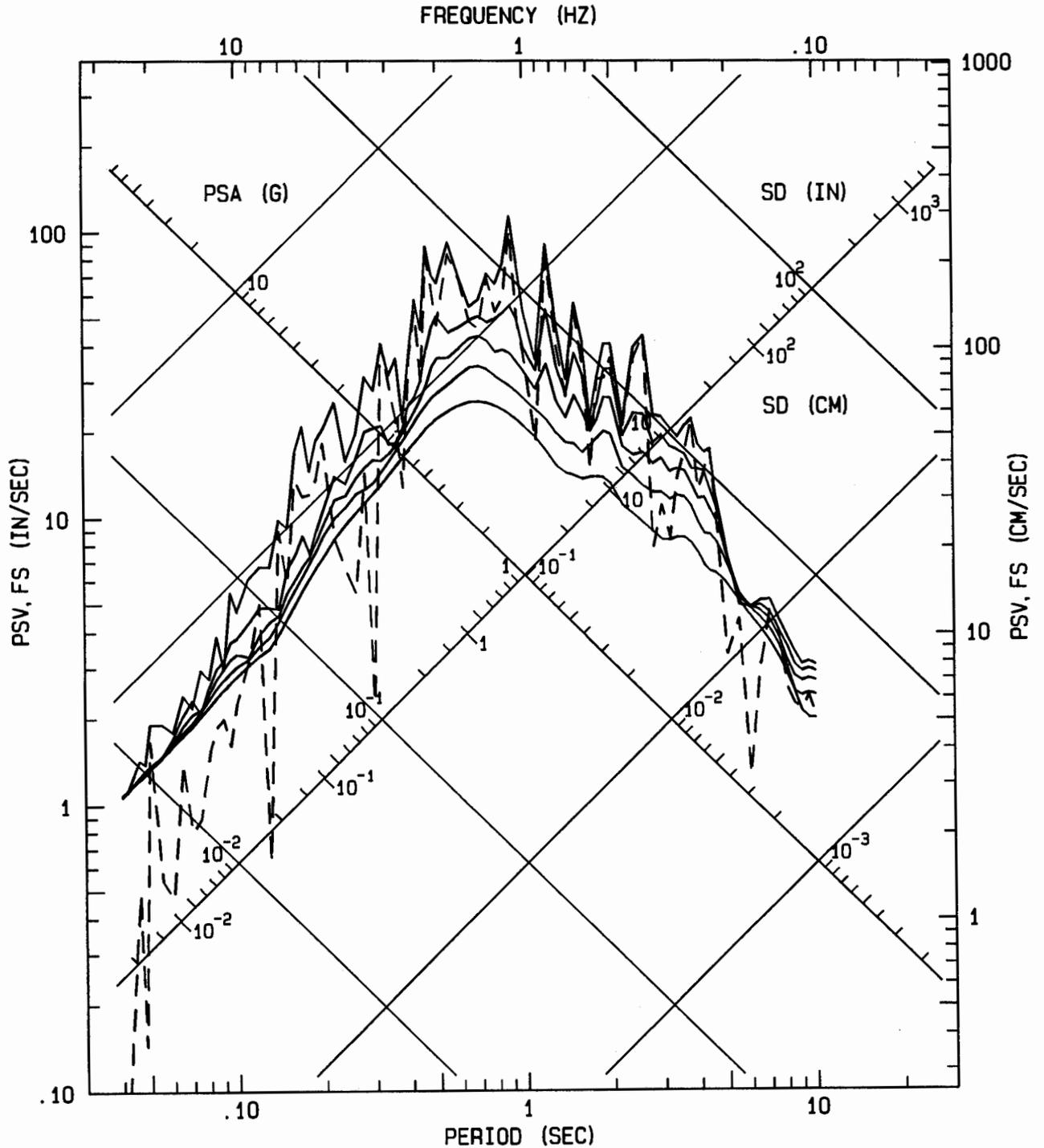
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DAMPING VALUES: 0, 2, 5, 10, 20%



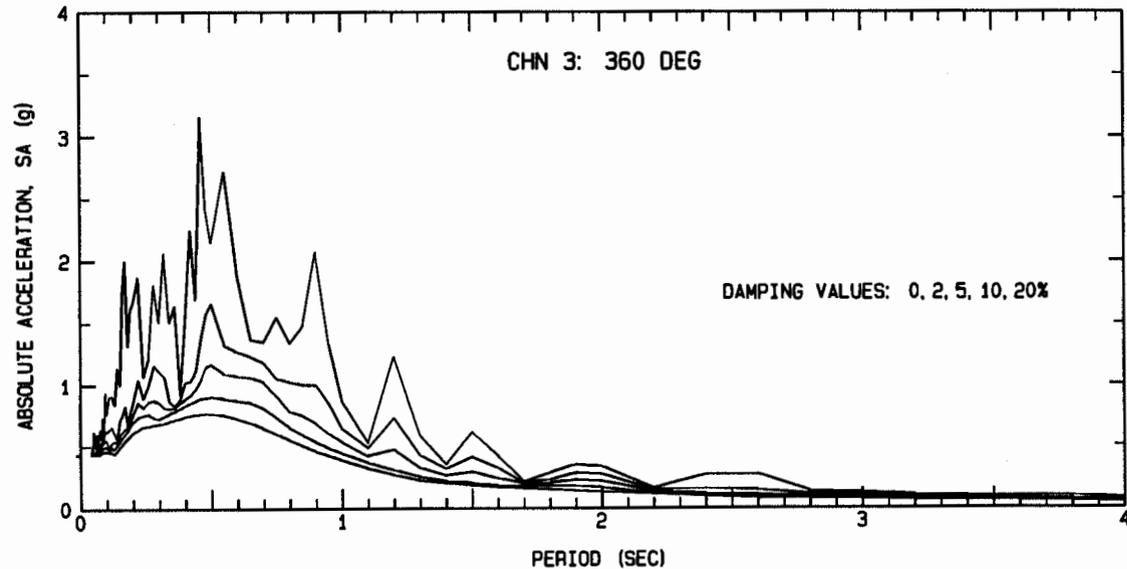
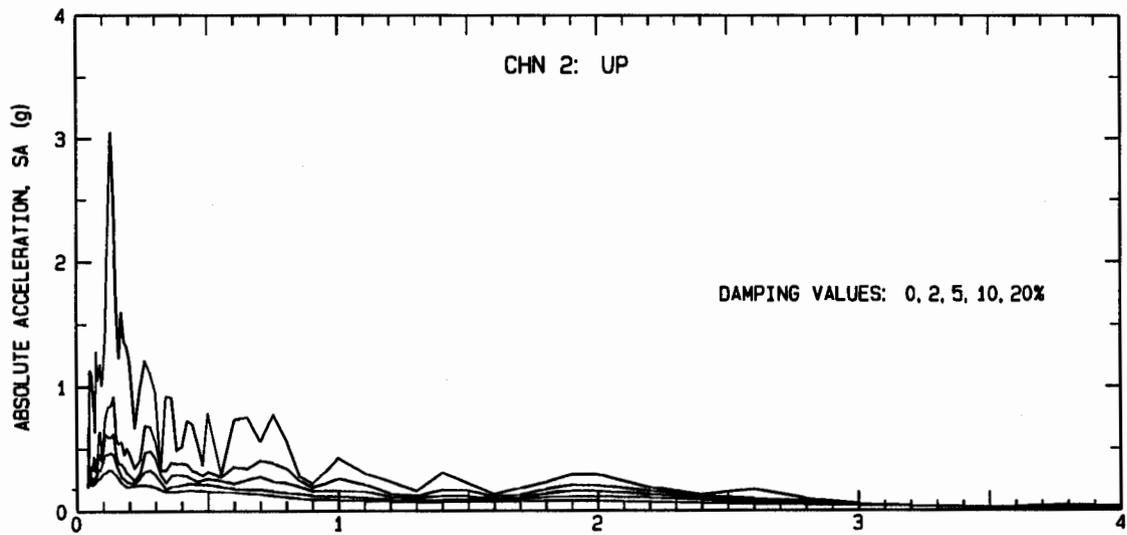
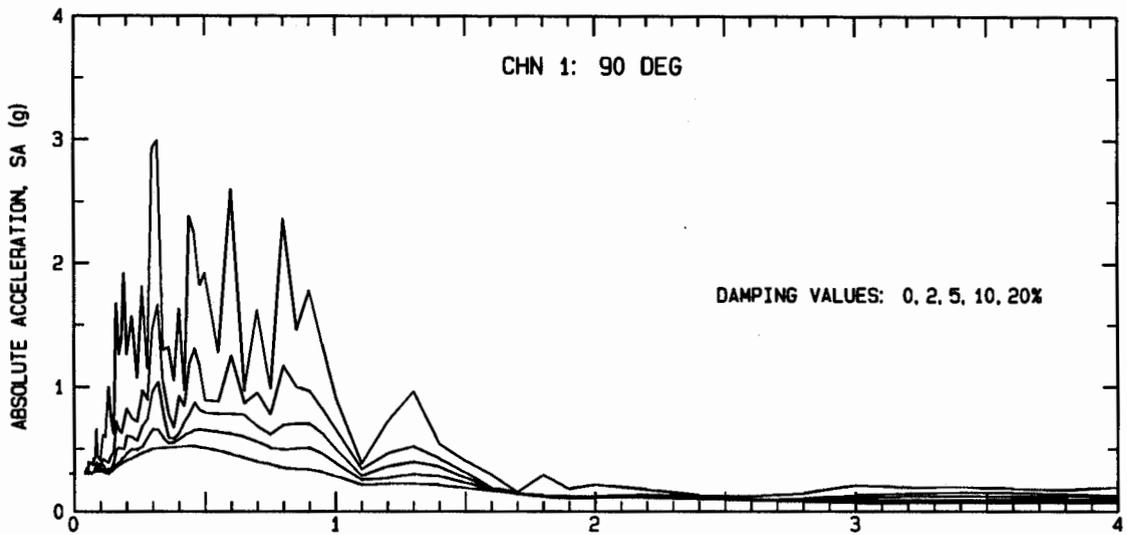
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 PACOIMA - KAGEL CANYON  
 CHN 3: 360 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .07-.14 TO 23.0-25.0 HZ.  
 24088-S1618-94018.02    032394.1045-QN94A088

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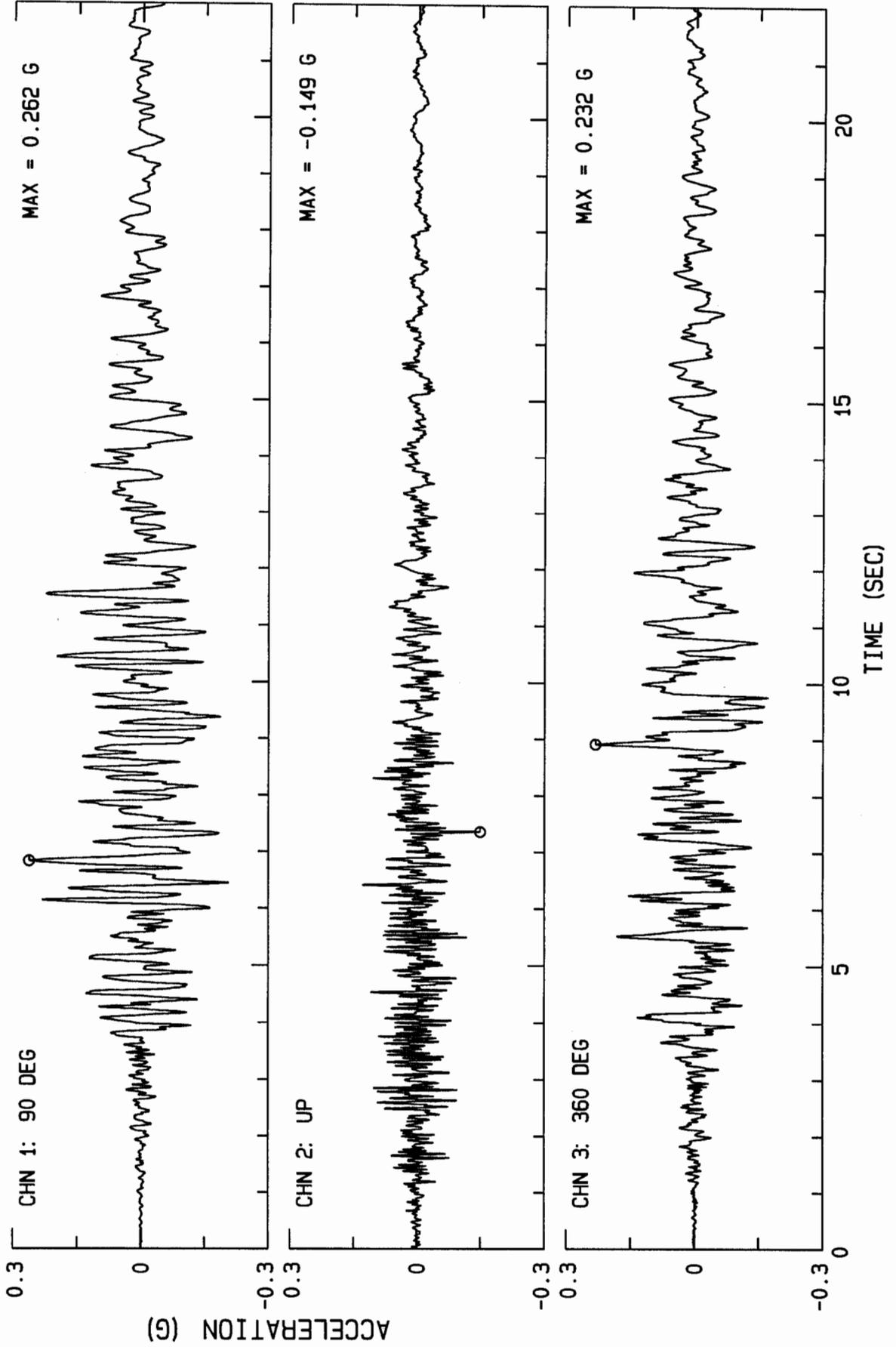
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PACOIMA - KAGEL CANYON  
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24088-S1618-94018.02 032394.1045-QN94A088



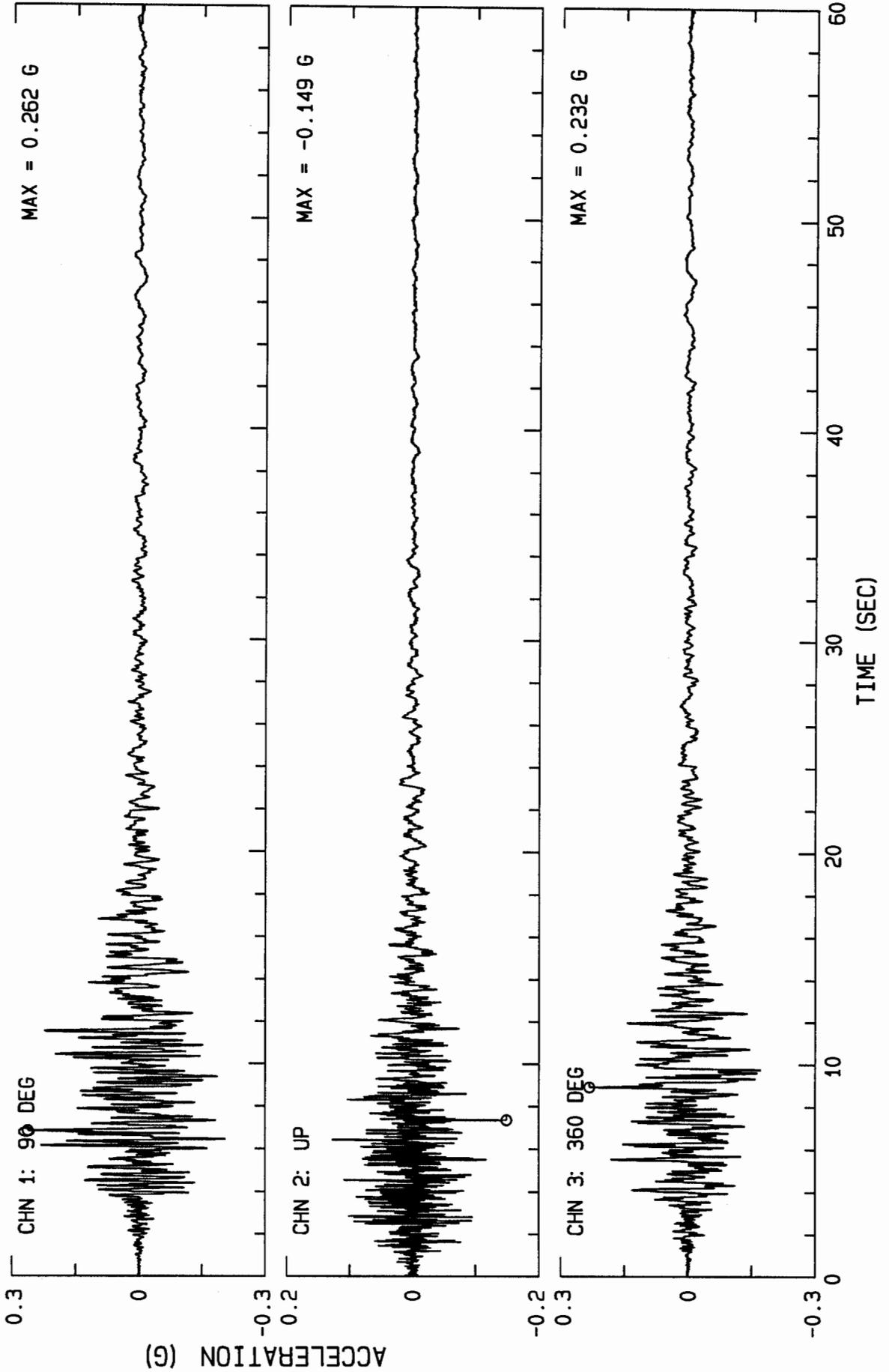


NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
CENTURY CITY - LACC NORTH

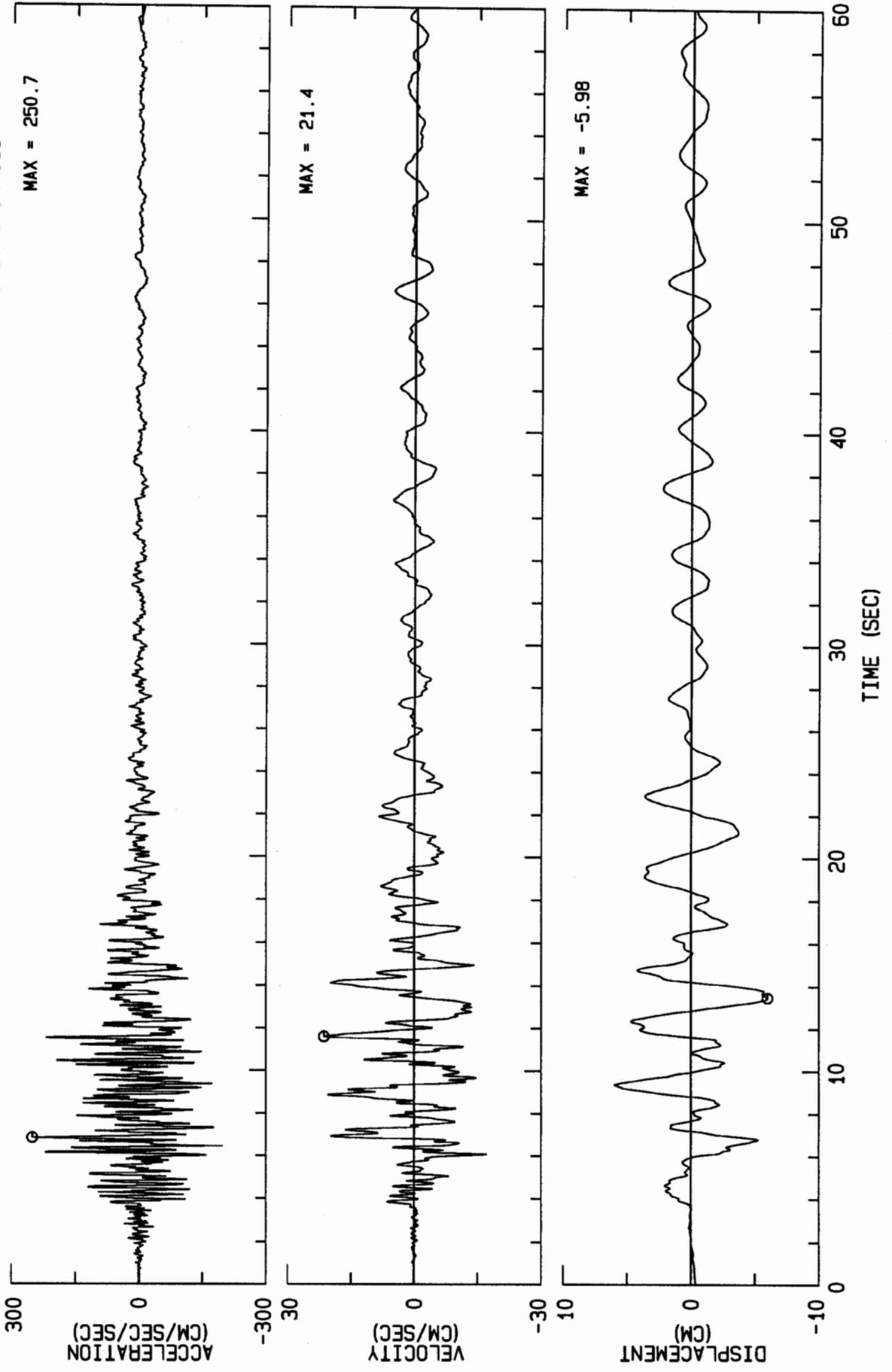
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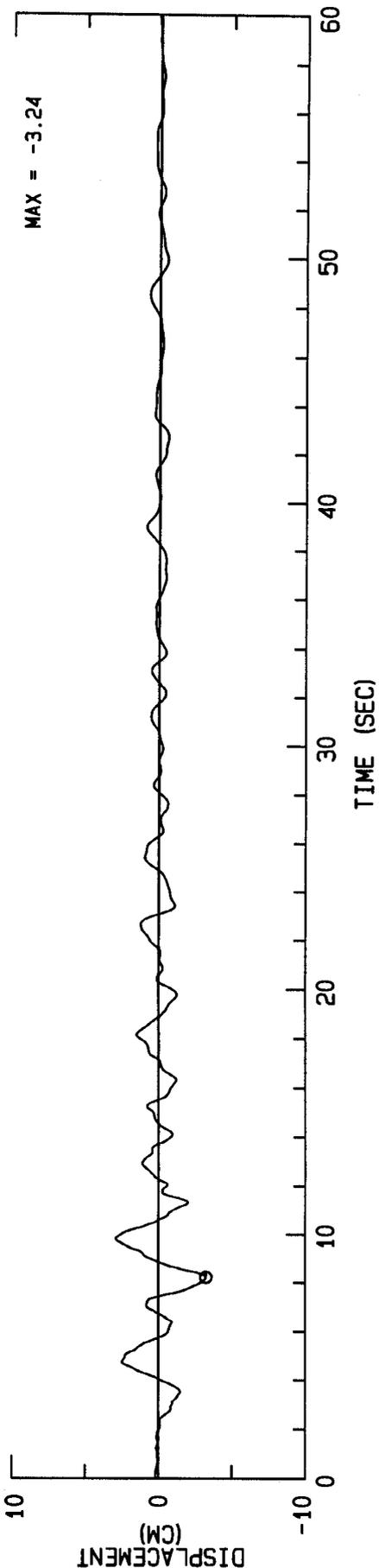
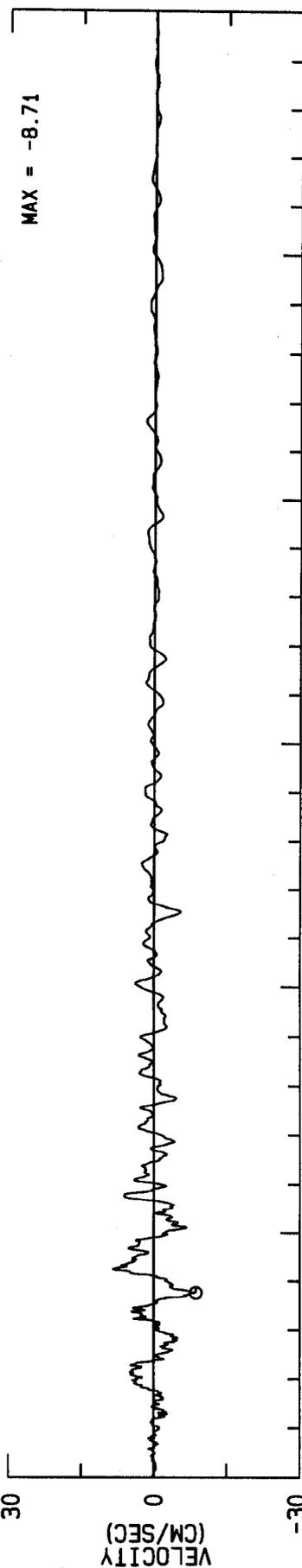
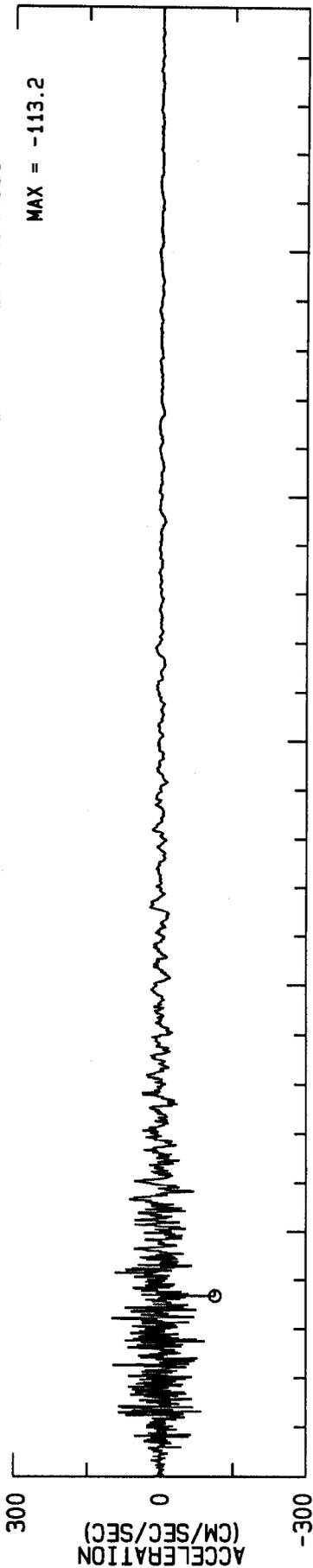
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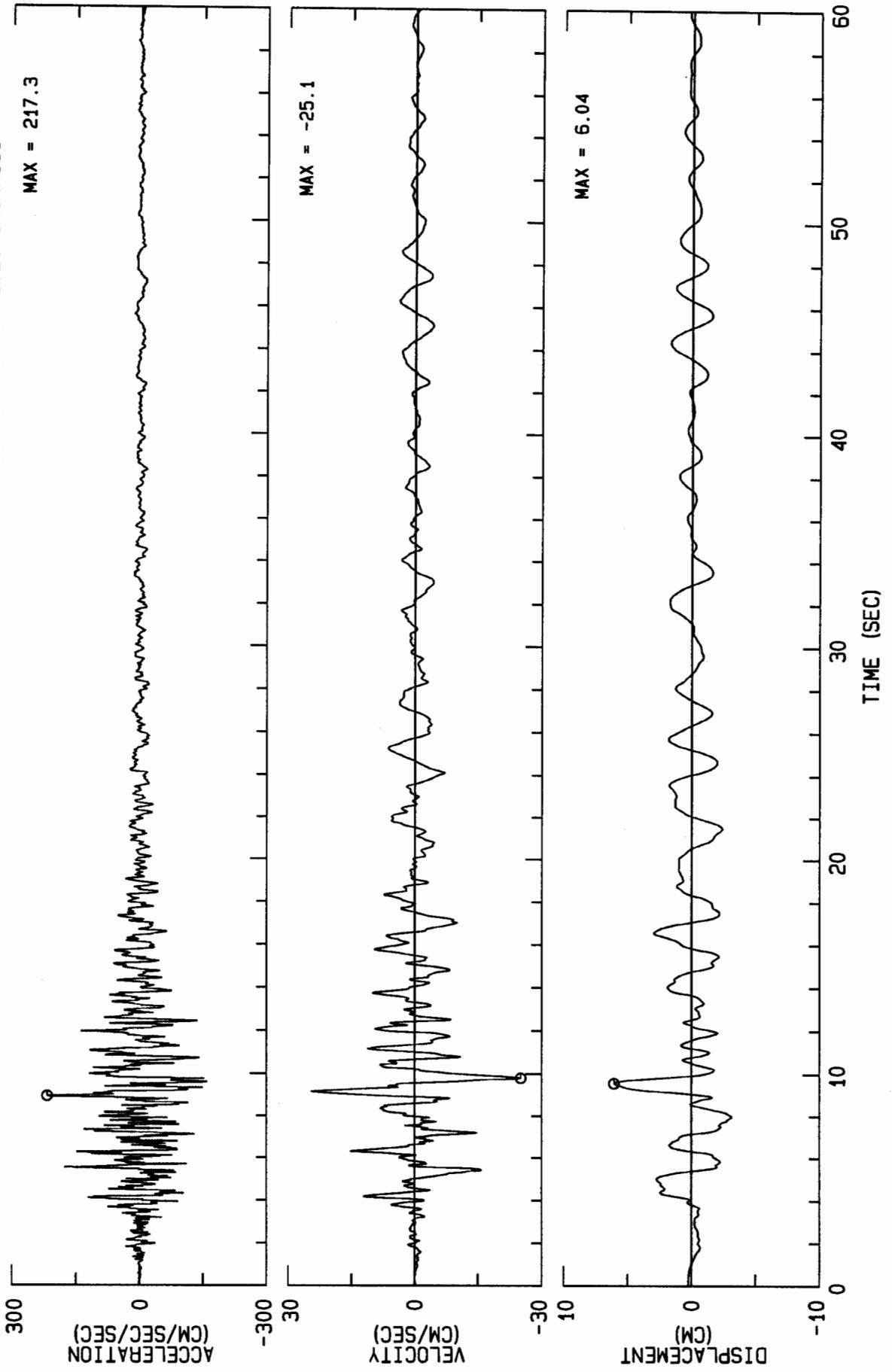
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
CENTURY CITY - LACC NORTH    CHN 1: 90 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .07-.14 TO 23.0-25.0 HZ.    24389-S2775-94019.02    020894.1623-QN94A389



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
CENTURY CITY - LACC NORTH    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .07-.14 TO 23.0-25.0 HZ.    24389-S2775-94019.02    020894.1623-QN94A389



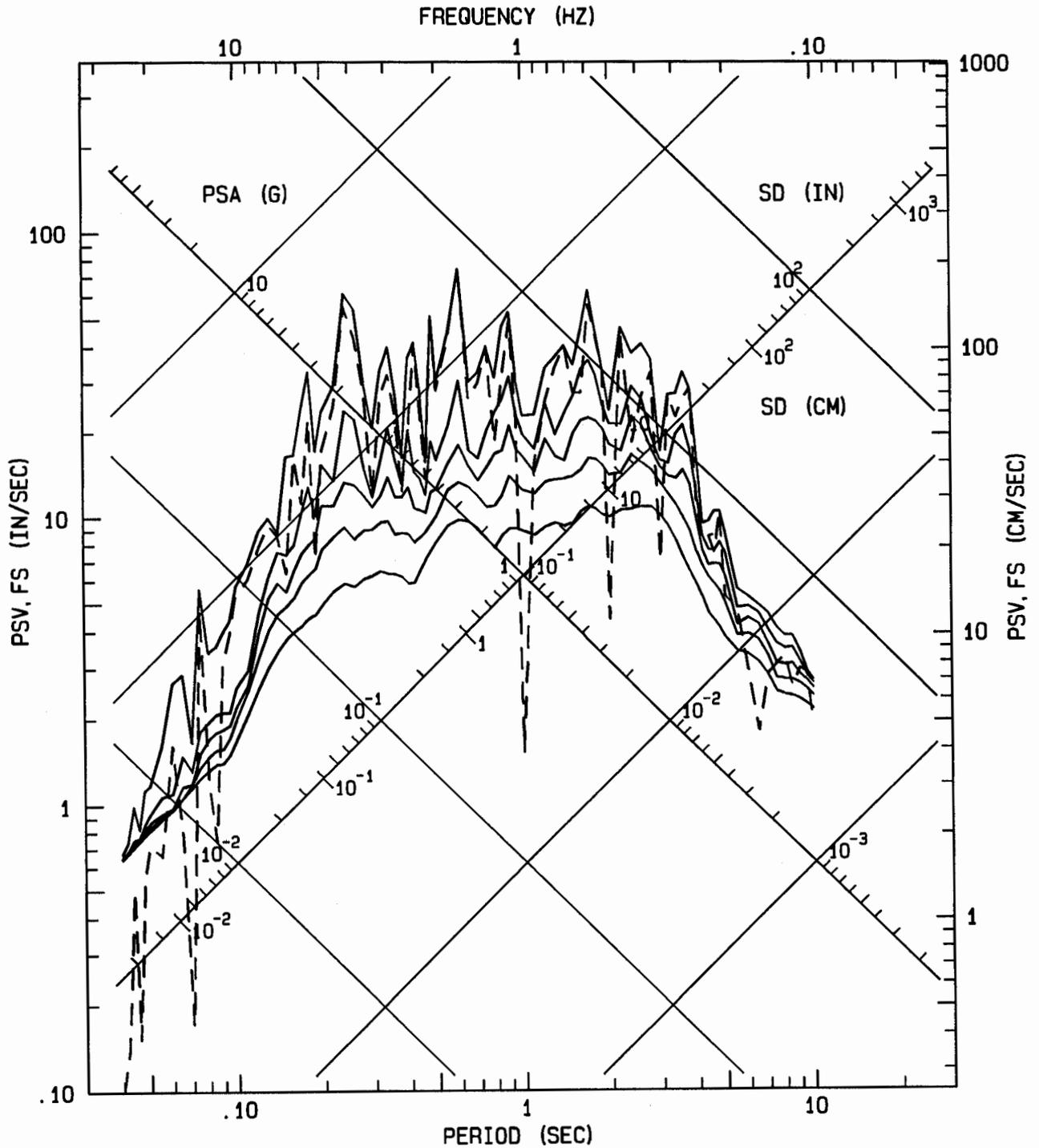
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FILTER BAND: .07-.14 TO 23.0-25.0 HZ.    24389-S2775-94019.02    020894.1623-QN94A389



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 CENTURY CITY - LACC NORTH  
 CHN 1: 90 DEG

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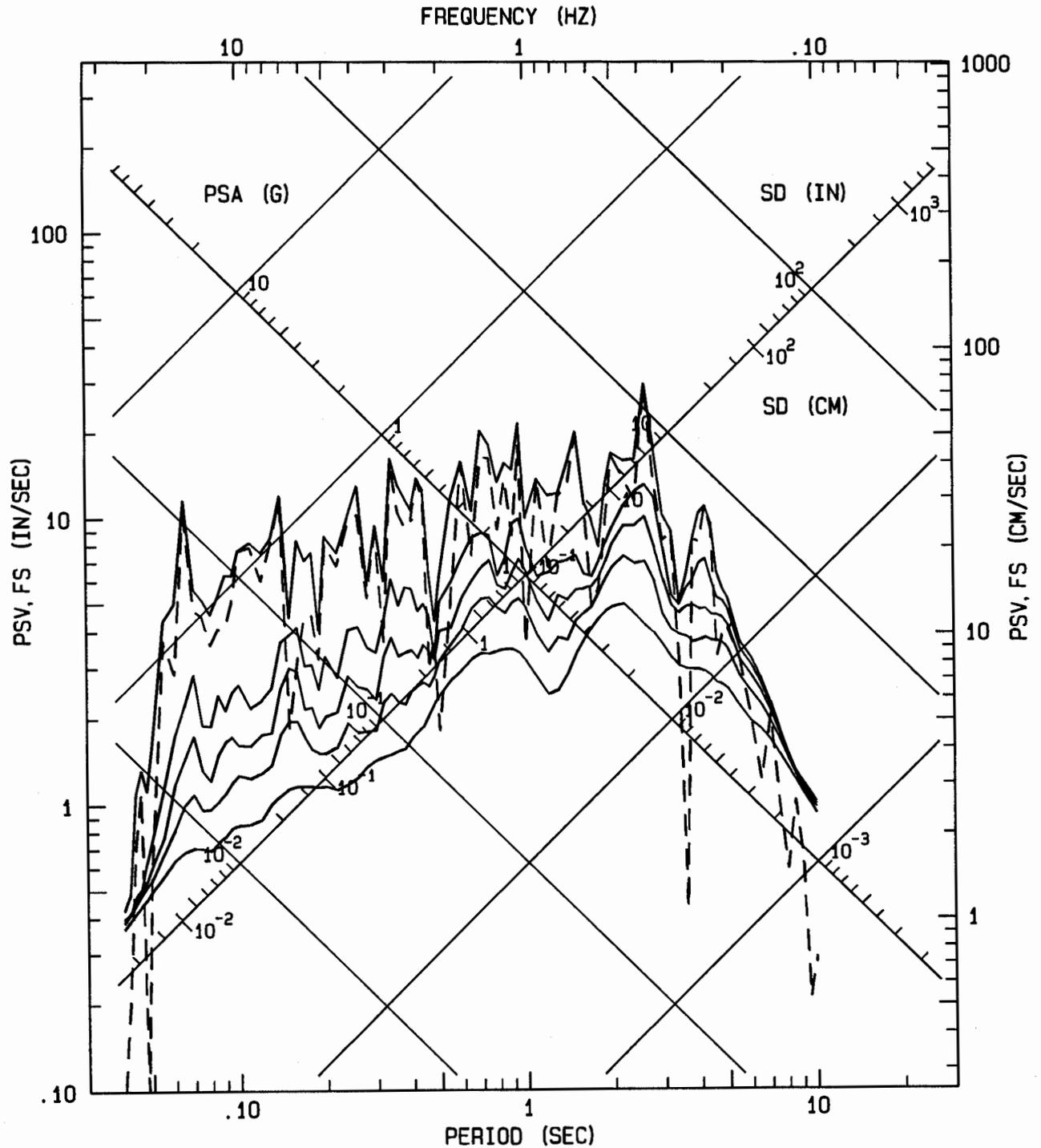
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 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 CENTURY CITY - LACC NORTH  
 CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .07-.14 TO 23.0-25.0 HZ.  
 24389-S2775-94019.02    032394.1036-QN94A389

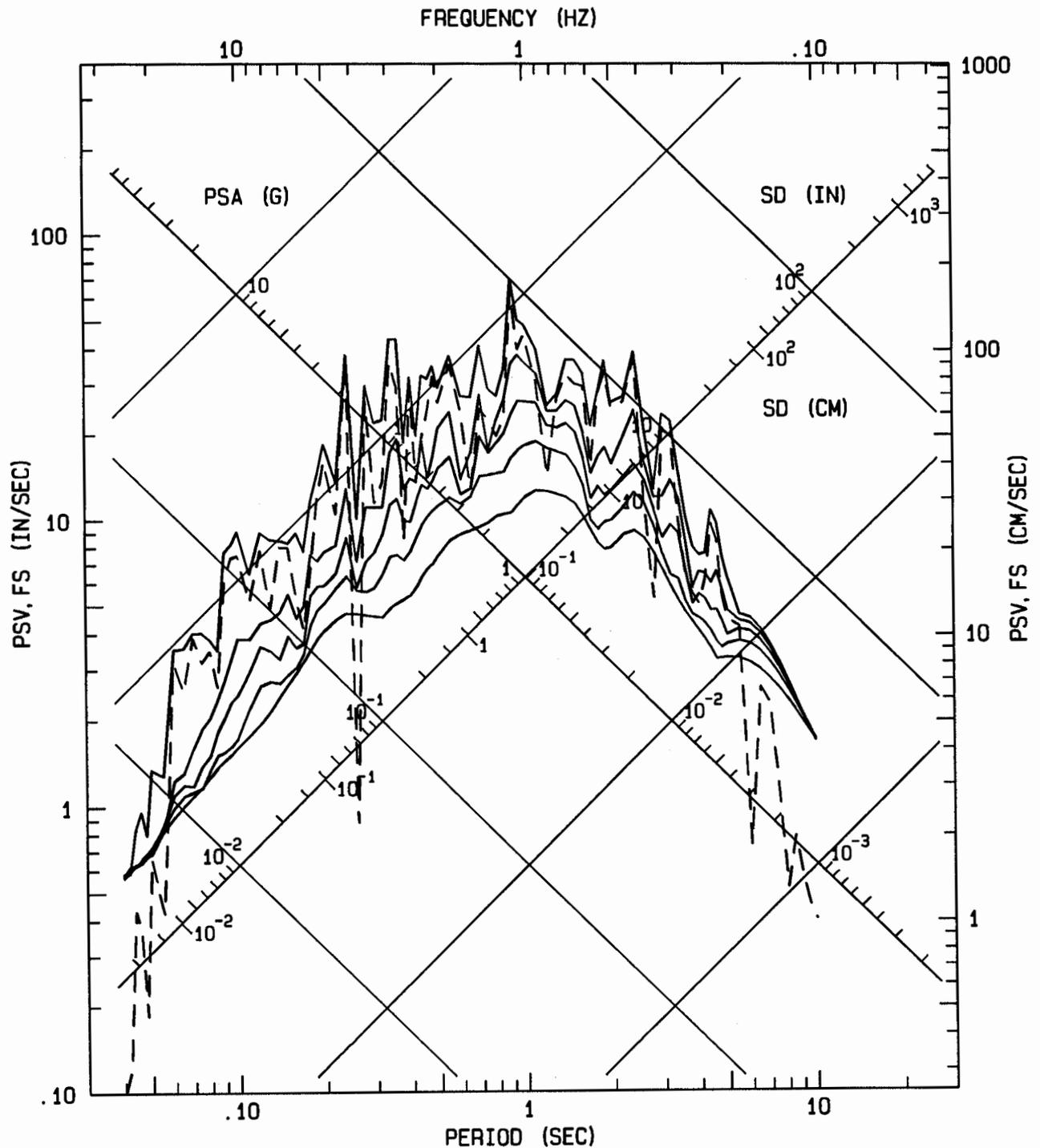
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



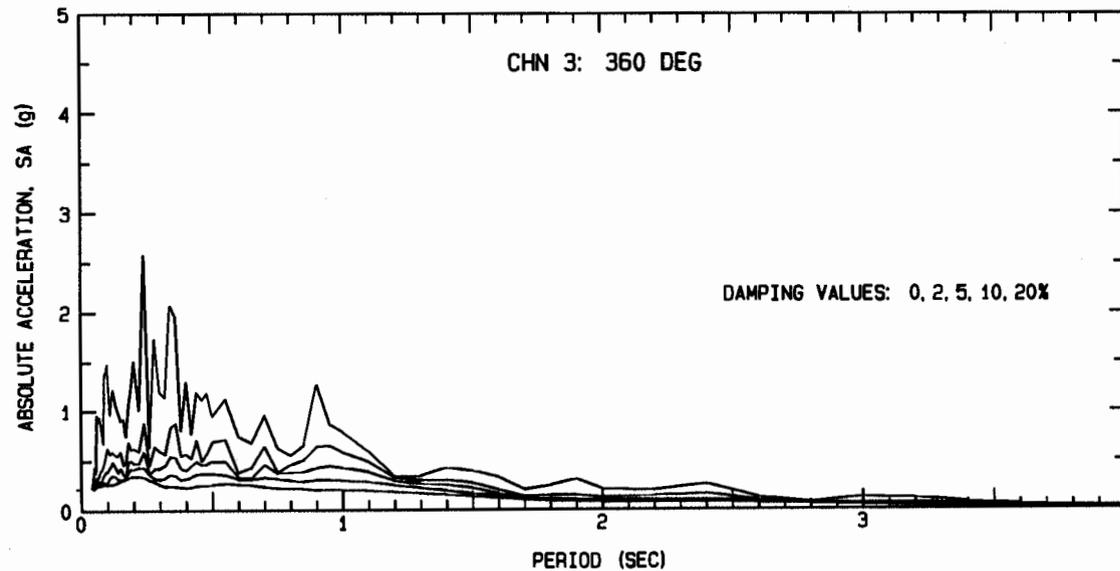
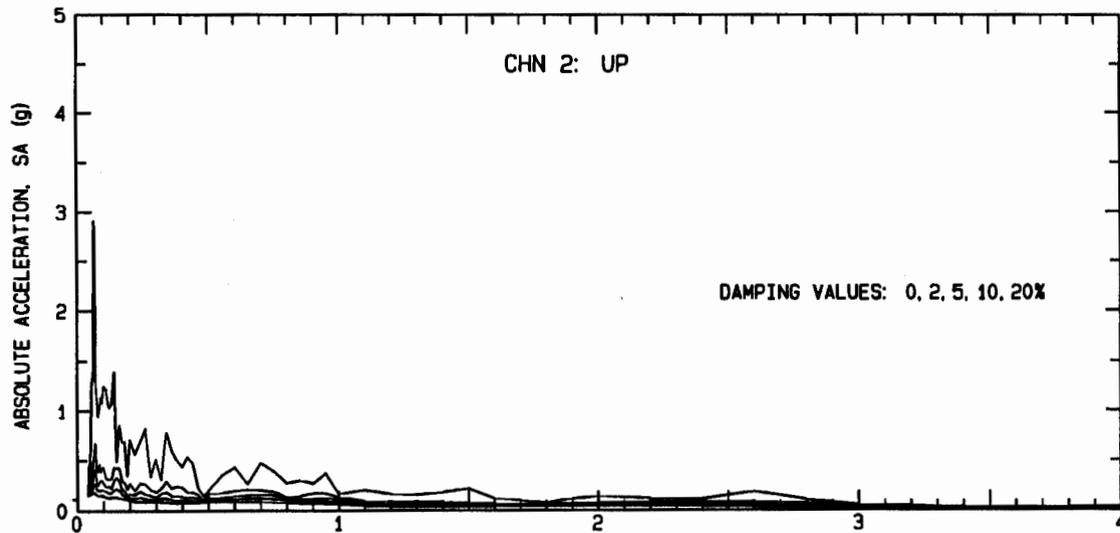
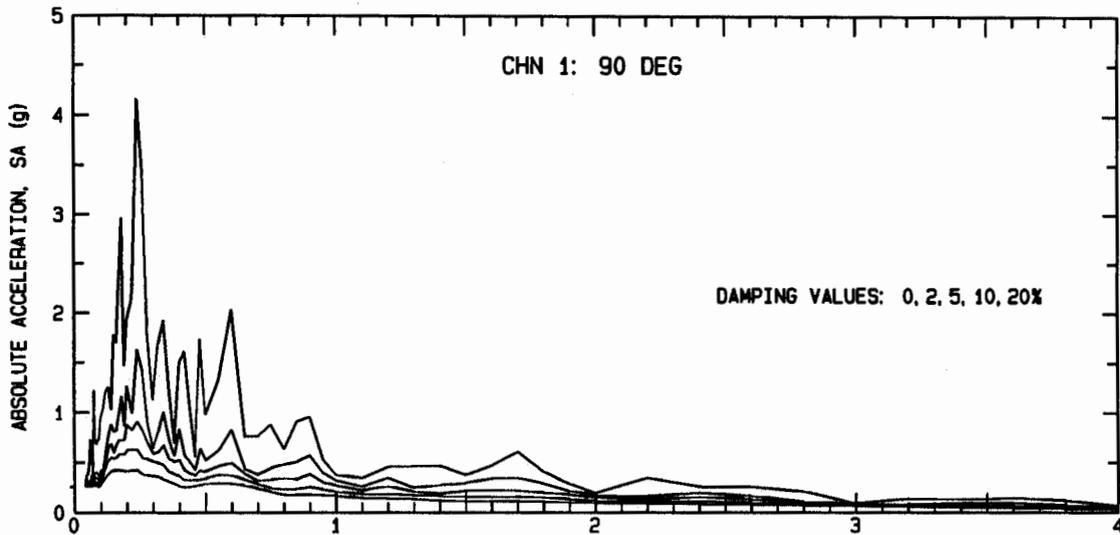
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 CENTURY CITY - LACC NORTH  
 CHN 3: 360 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .07-.14 TO 23.0-25.0 HZ.  
 24389-S2775-94019.02    032394.1036-QN94A389

— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



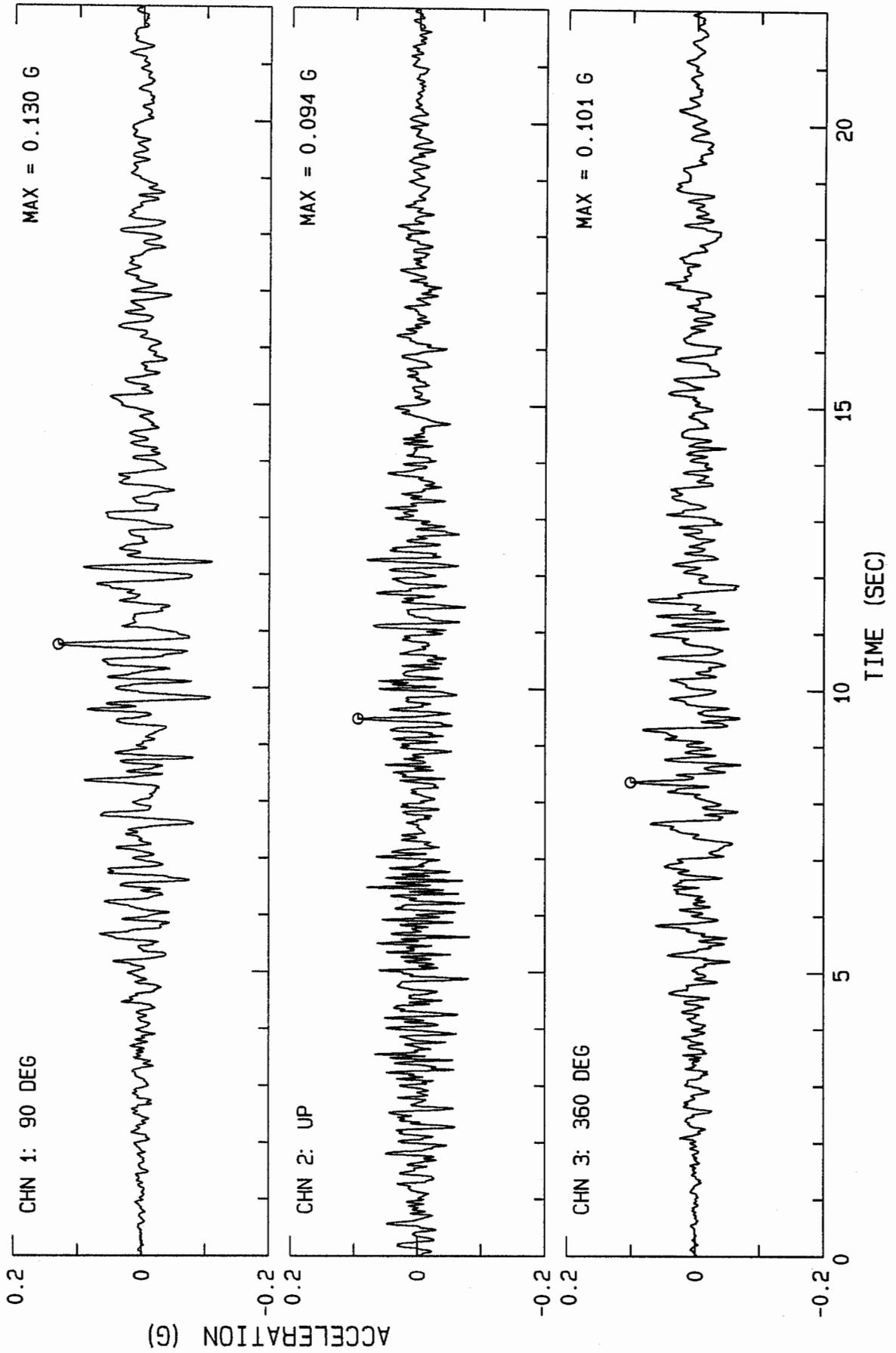
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CENTURY CITY - LACC NORTH  
ACCELEROGRAM BANOPASS-FILTERED WITH RAMPS AT .07-.14 TO 23.0-25.0 HZ.  
24389-S2775-94019.02    032394.1036-QN94A389





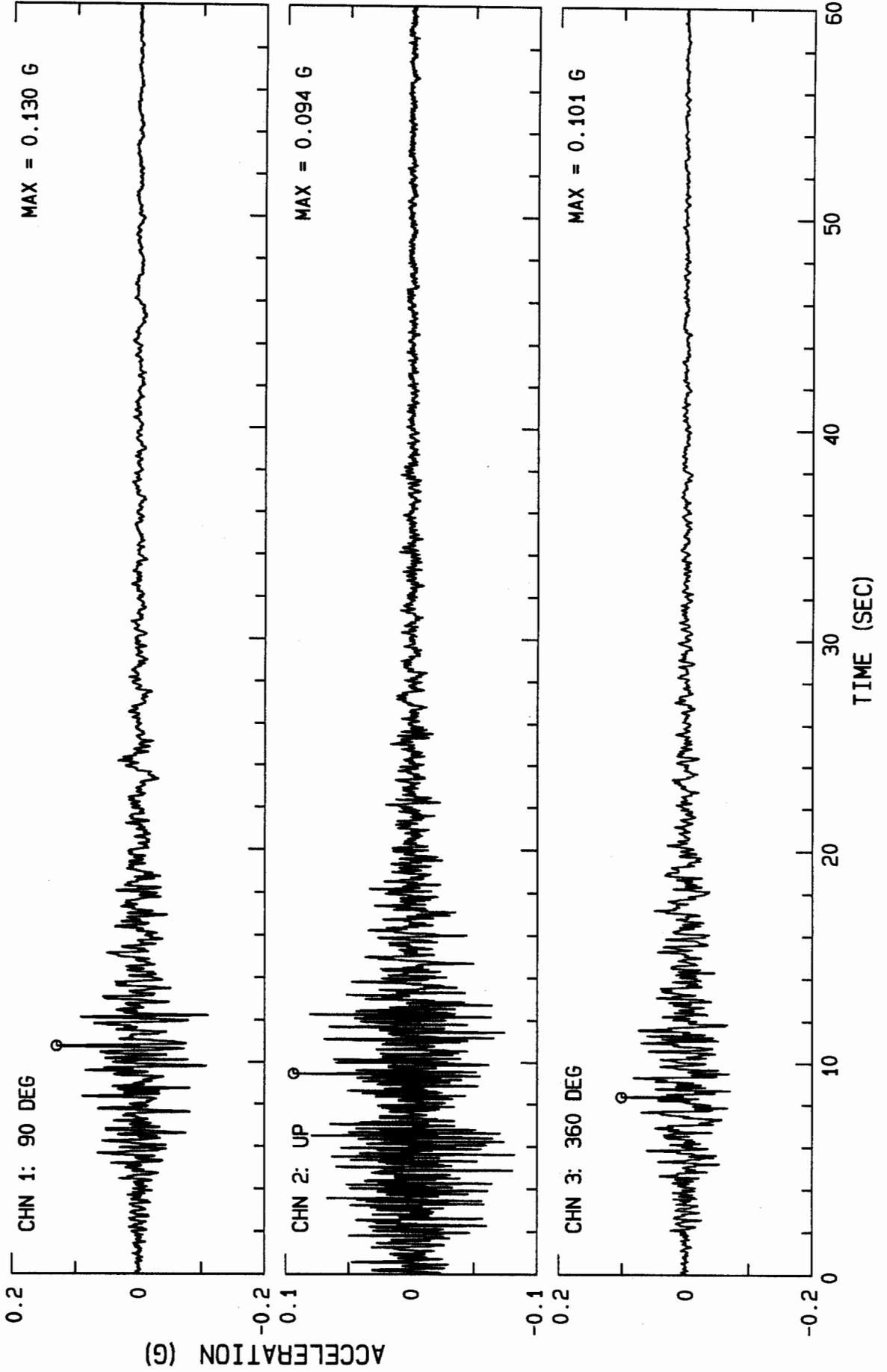
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
MALIBU - POINT DUME

UNCORRECTED ACCELEROGRAM    24396-S2779-94026.02    031194.1034-QN94A396

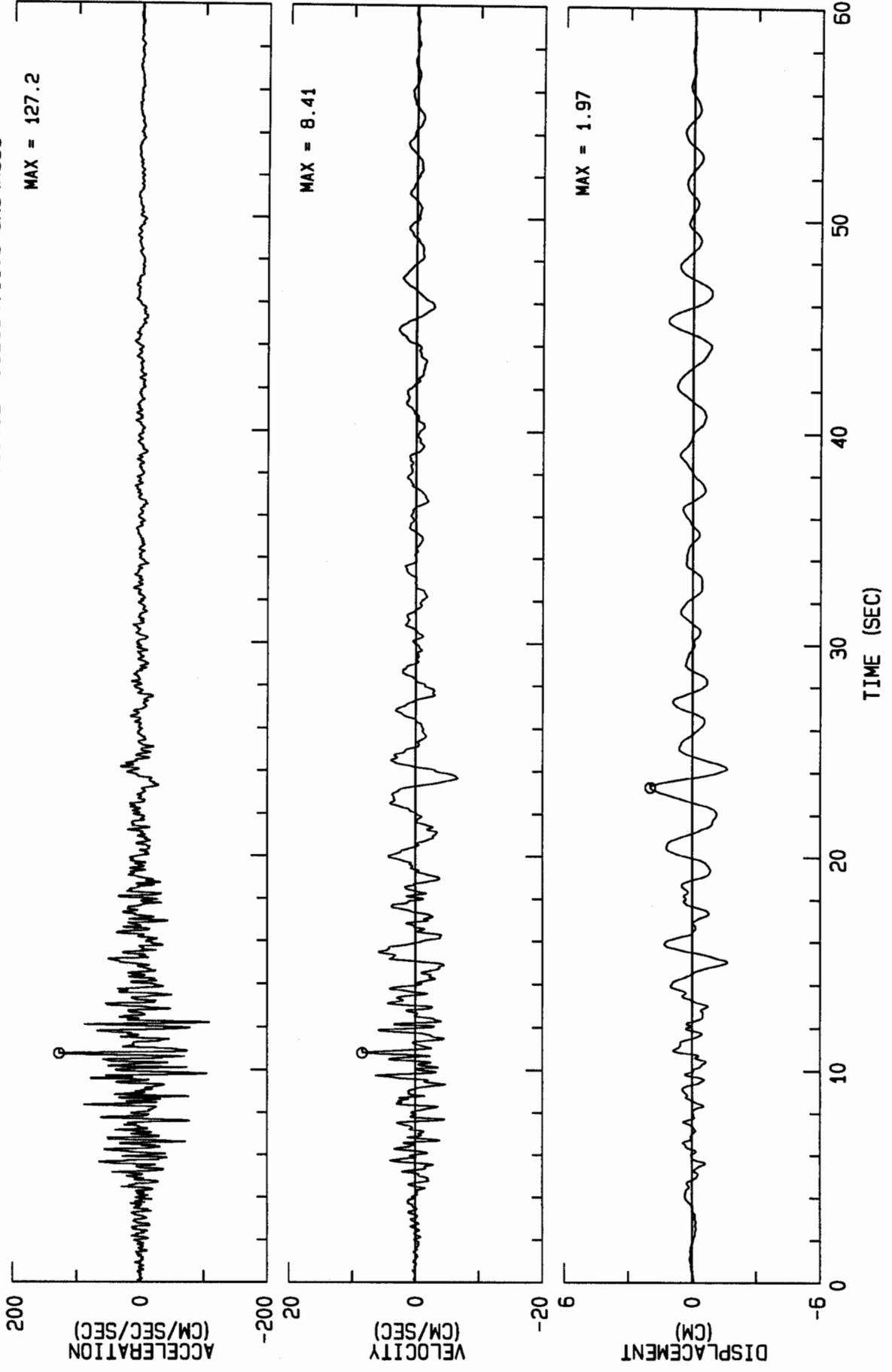


NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
MALIBU - POINT DUME

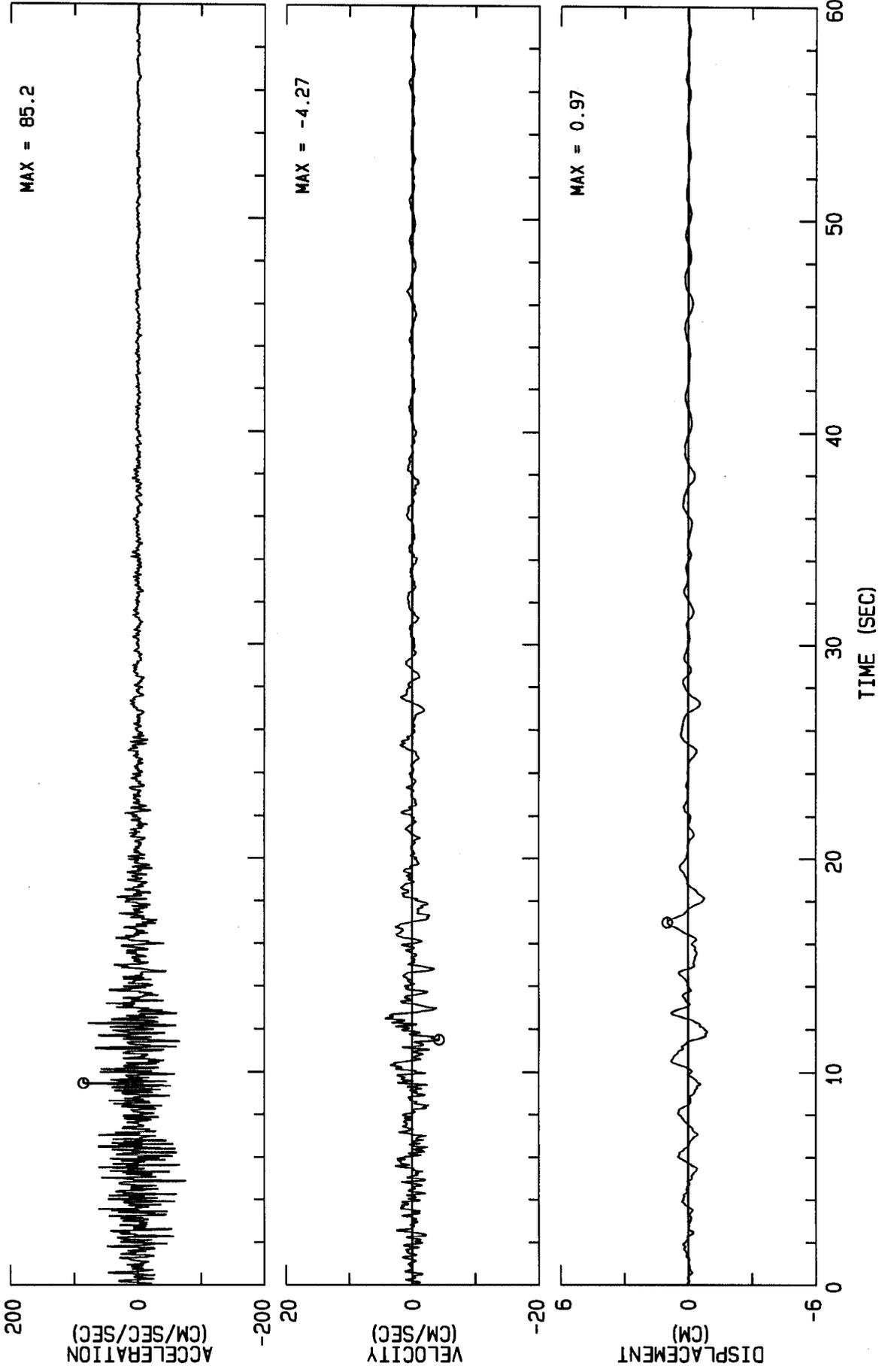
UNCORRECTED ACCELEROGRAM    24396-S2779-94026.02    031494.1450-QN94A396



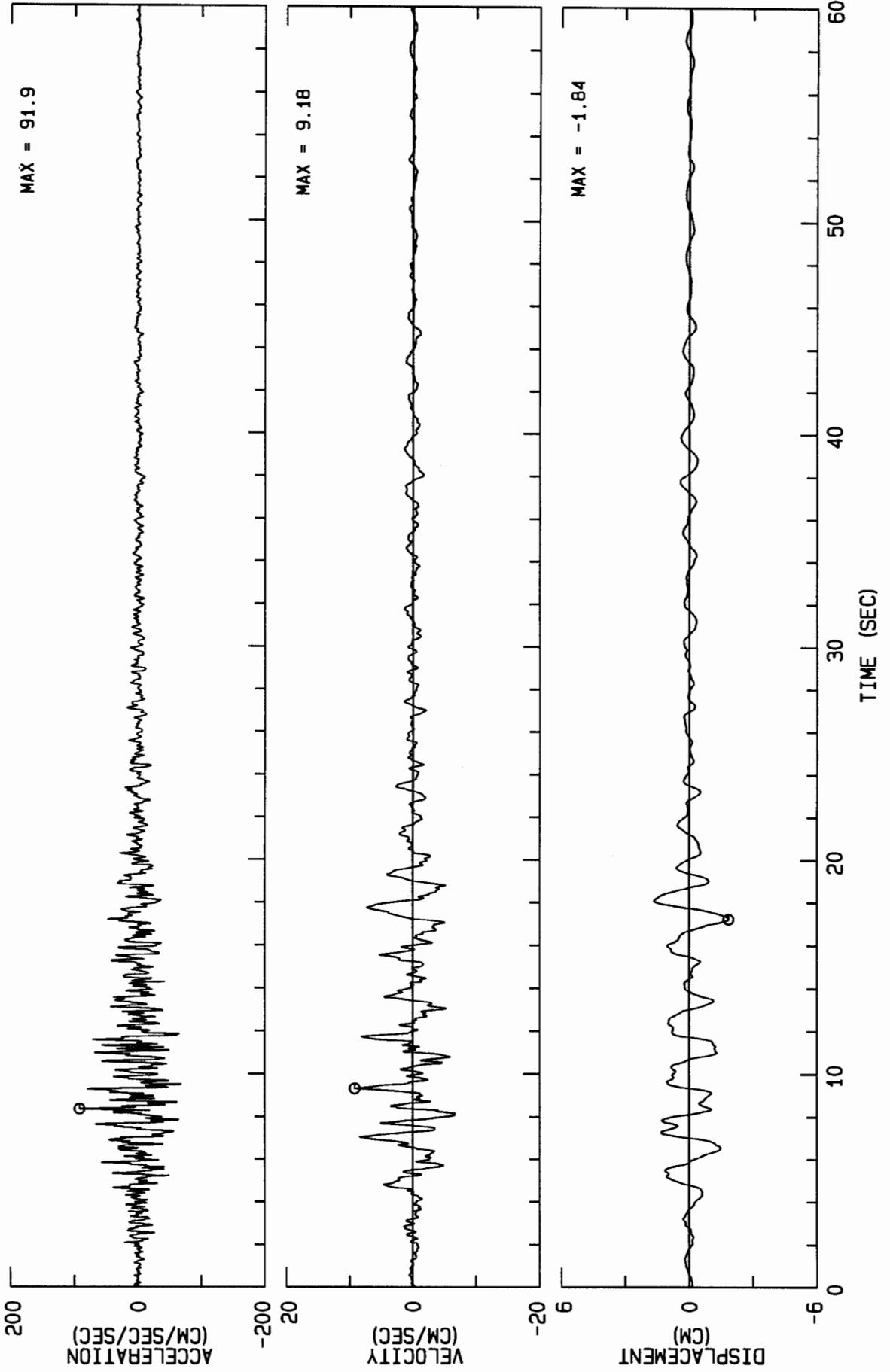
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
MALIBU - POINT DUME    CHN 1: 90 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    24396-S2779-94026.02    032394.1108-QN94A396



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
MALIBU - POINT DUME    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    24396-S2779-94026.02    032394.1108-QN94A396



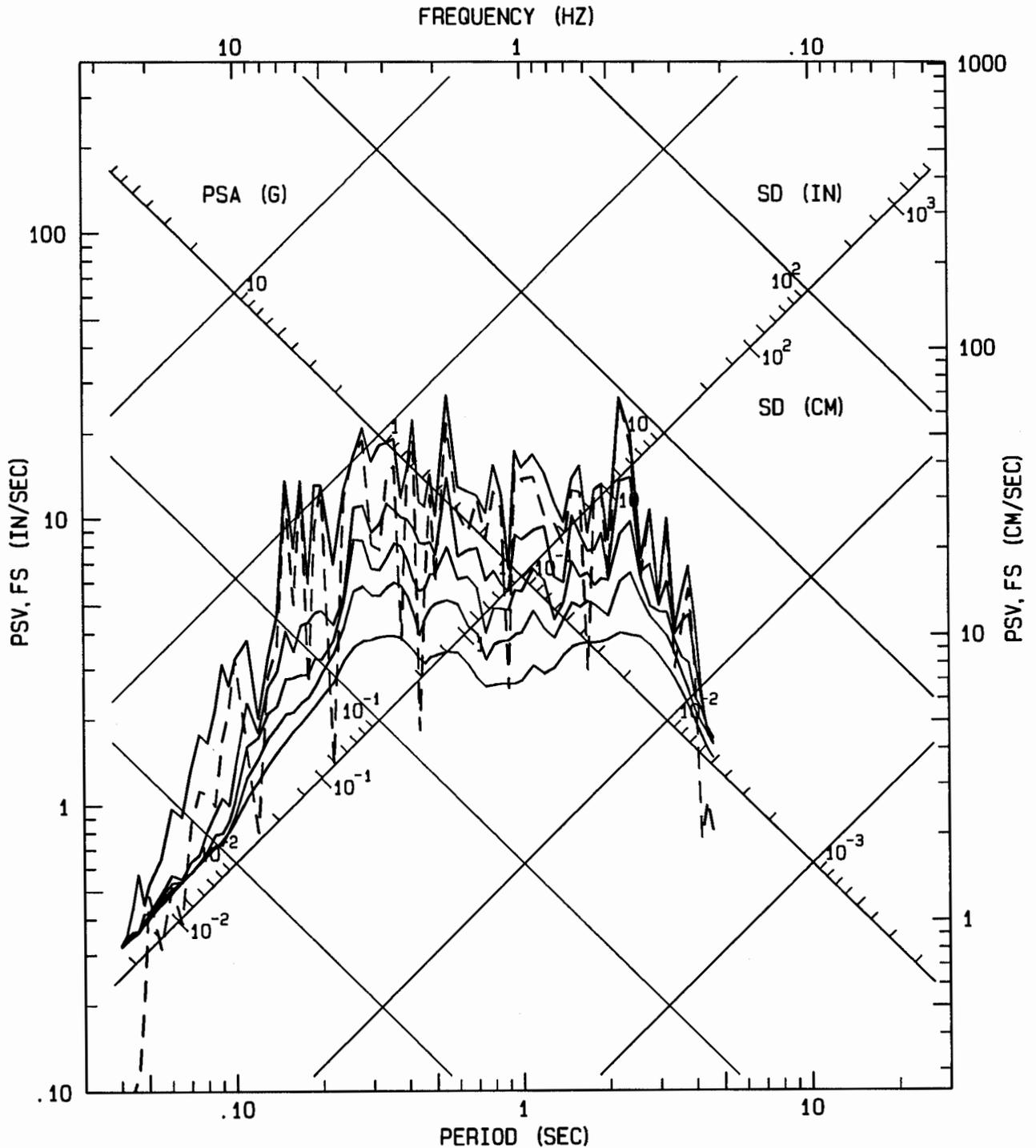
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
MALIBU - POINT DUME    CHN 3: 360 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    24396-S2779-94026.02    032394.1108-QN94A396



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 MALIBU - POINT DUME  
 CHN 1: 90 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 24396-S2779-94026.02    032394.1118-QN94A396

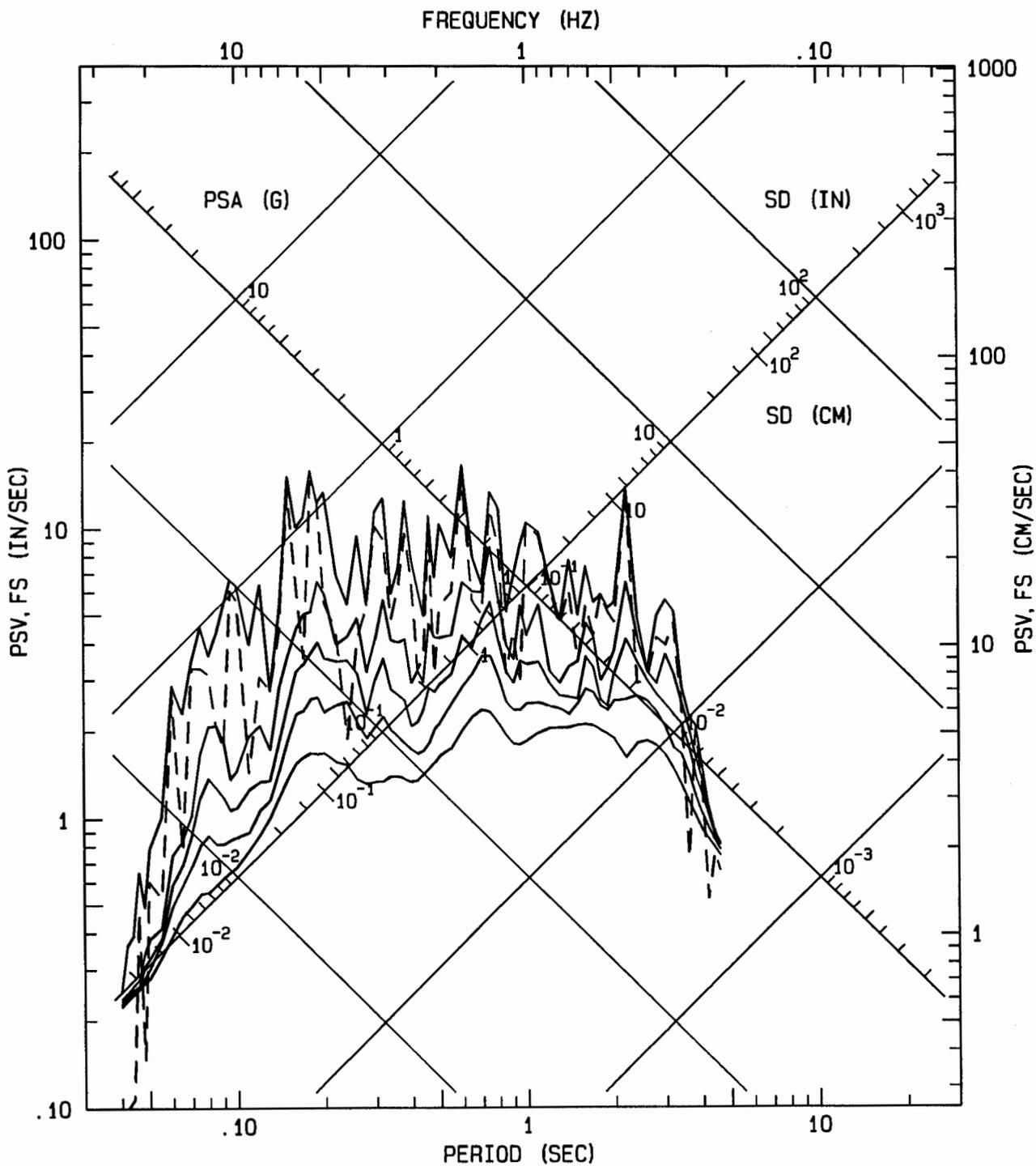
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
MALIBU - POINT DUME  
CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
24396-S2779-94026.02 032394.1118-QN94A396

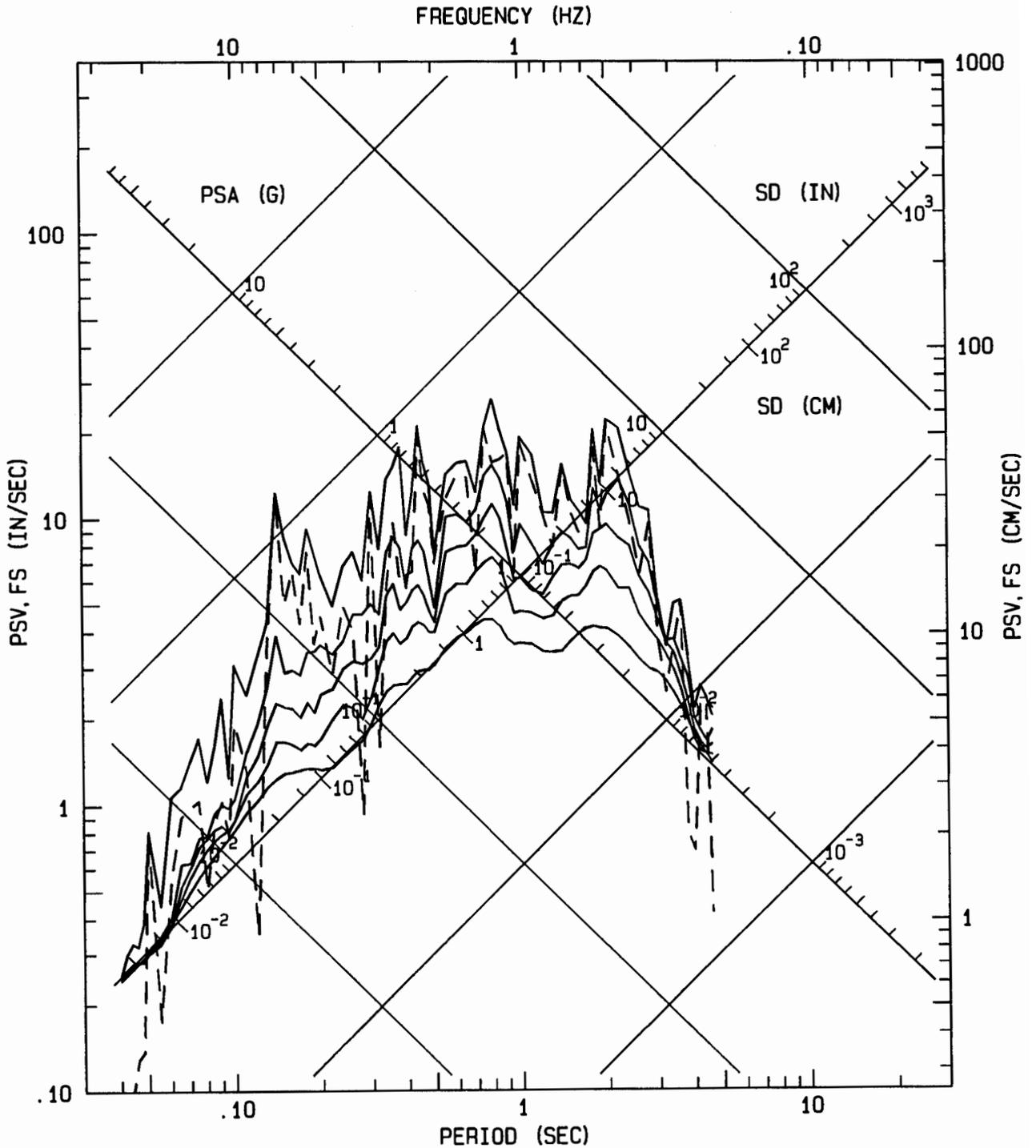
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
DAMPING VALUES: 0, 2, 5, 10, 20%



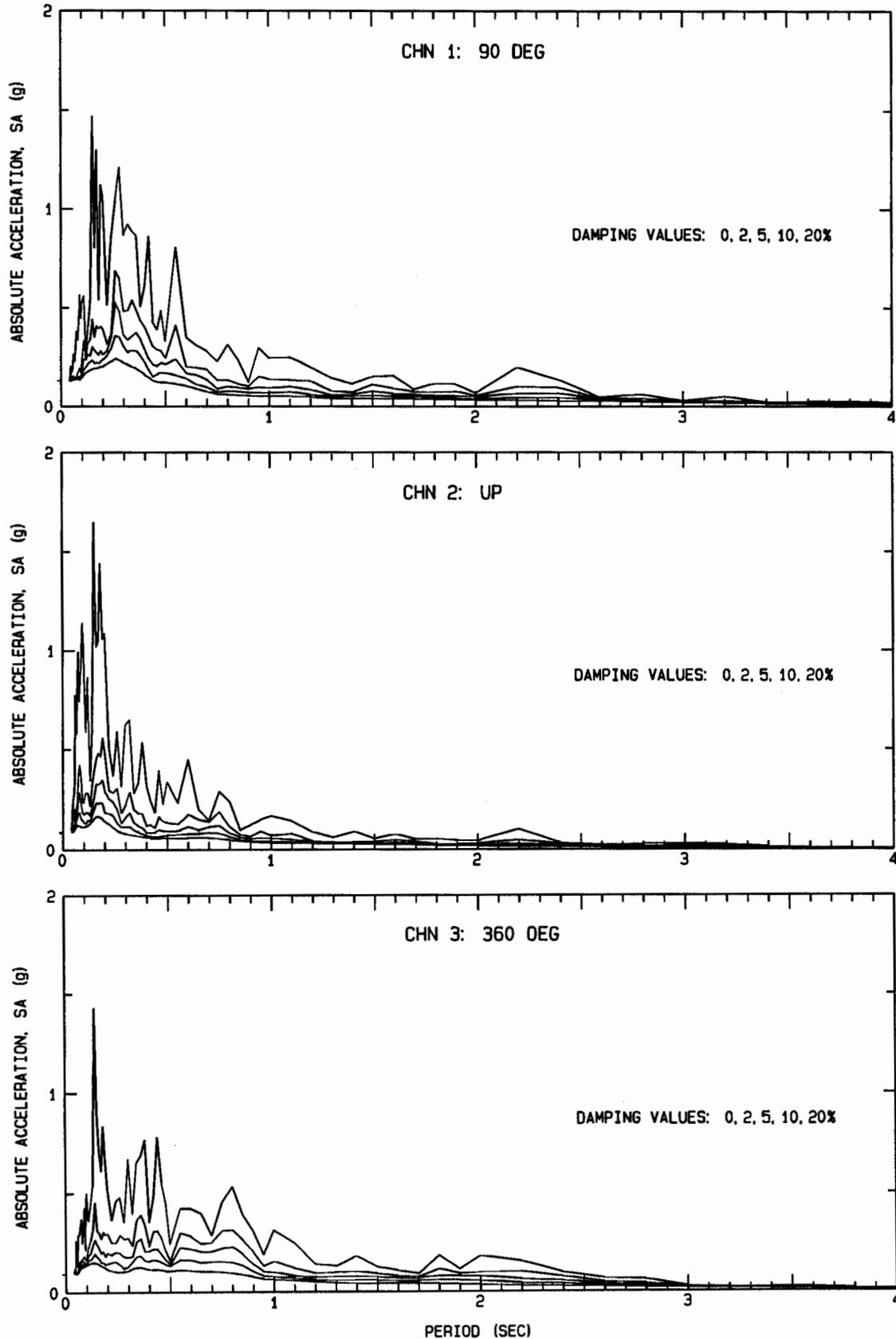
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 MALIBU - POINT DUME  
 CHN 3: 360 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 24396-S2779-94026.02    032394.1118-GN94A396

— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



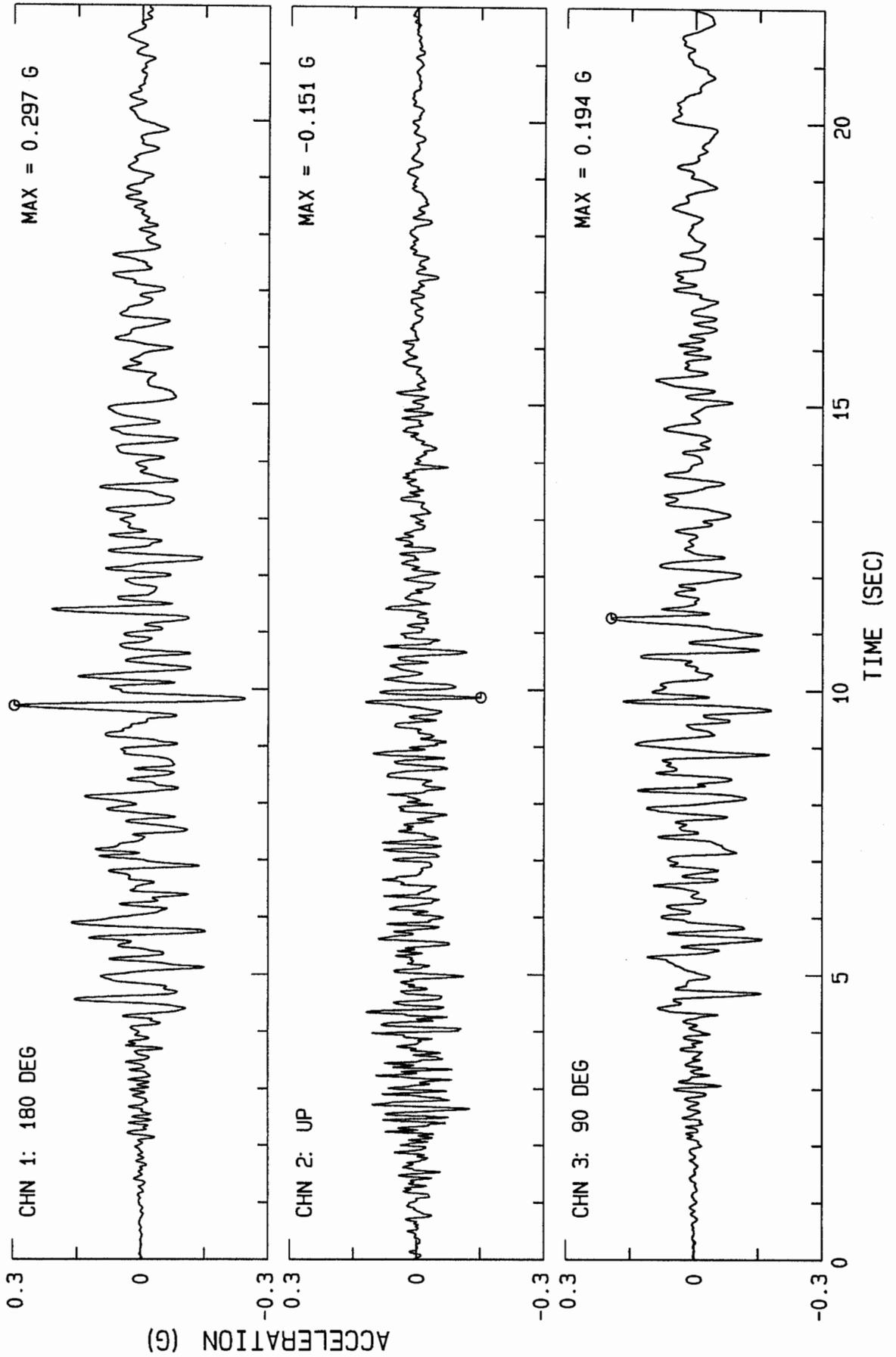
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
MALIBU - POINT DUME  
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
24396-S2779-94026.02    032394.1118-QN94A396





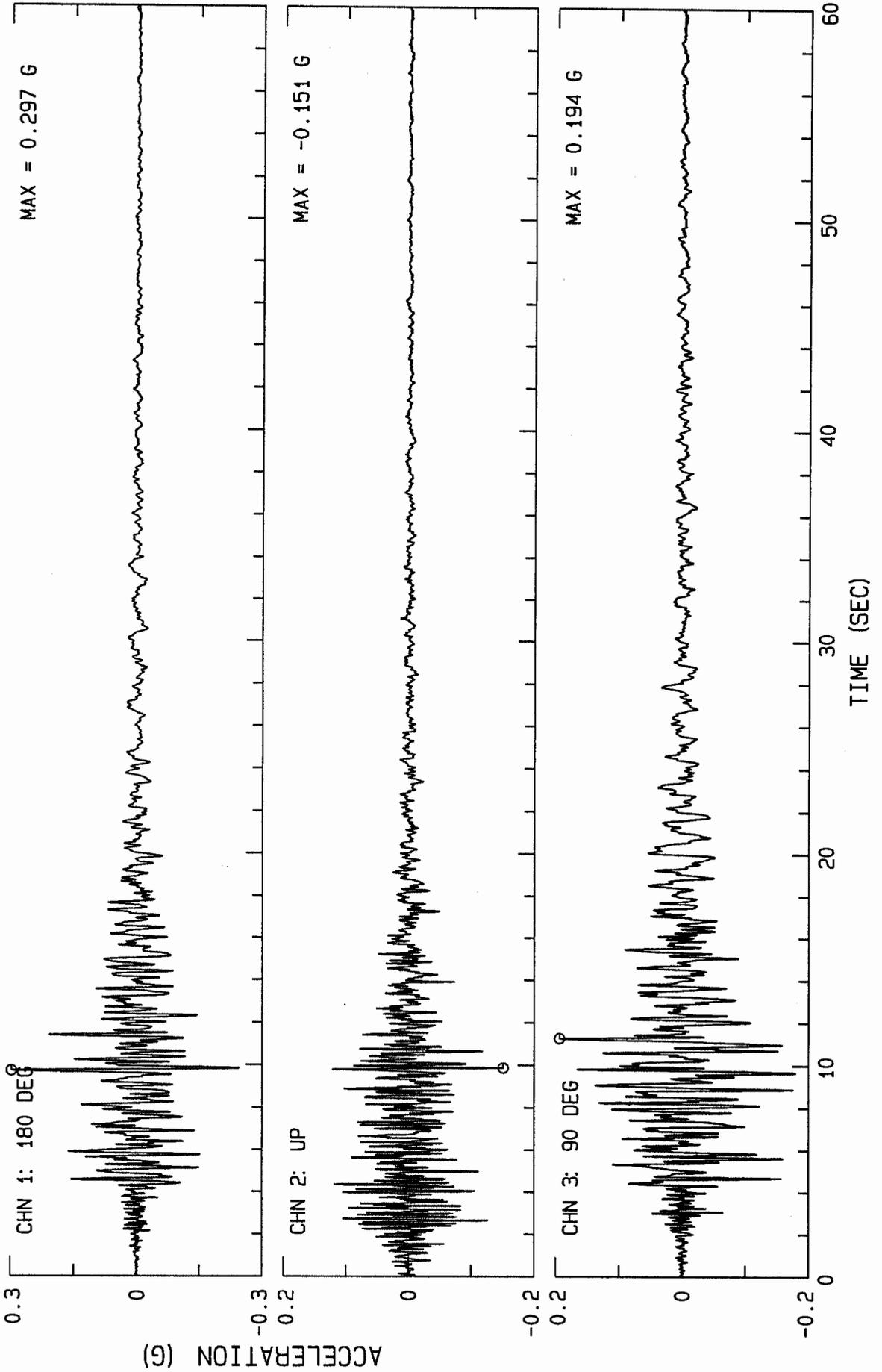
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
MOORPARK

UNCORRECTED ACCELEROGRAM 24283-S2509-94020.02 030394.1449-QN94A283

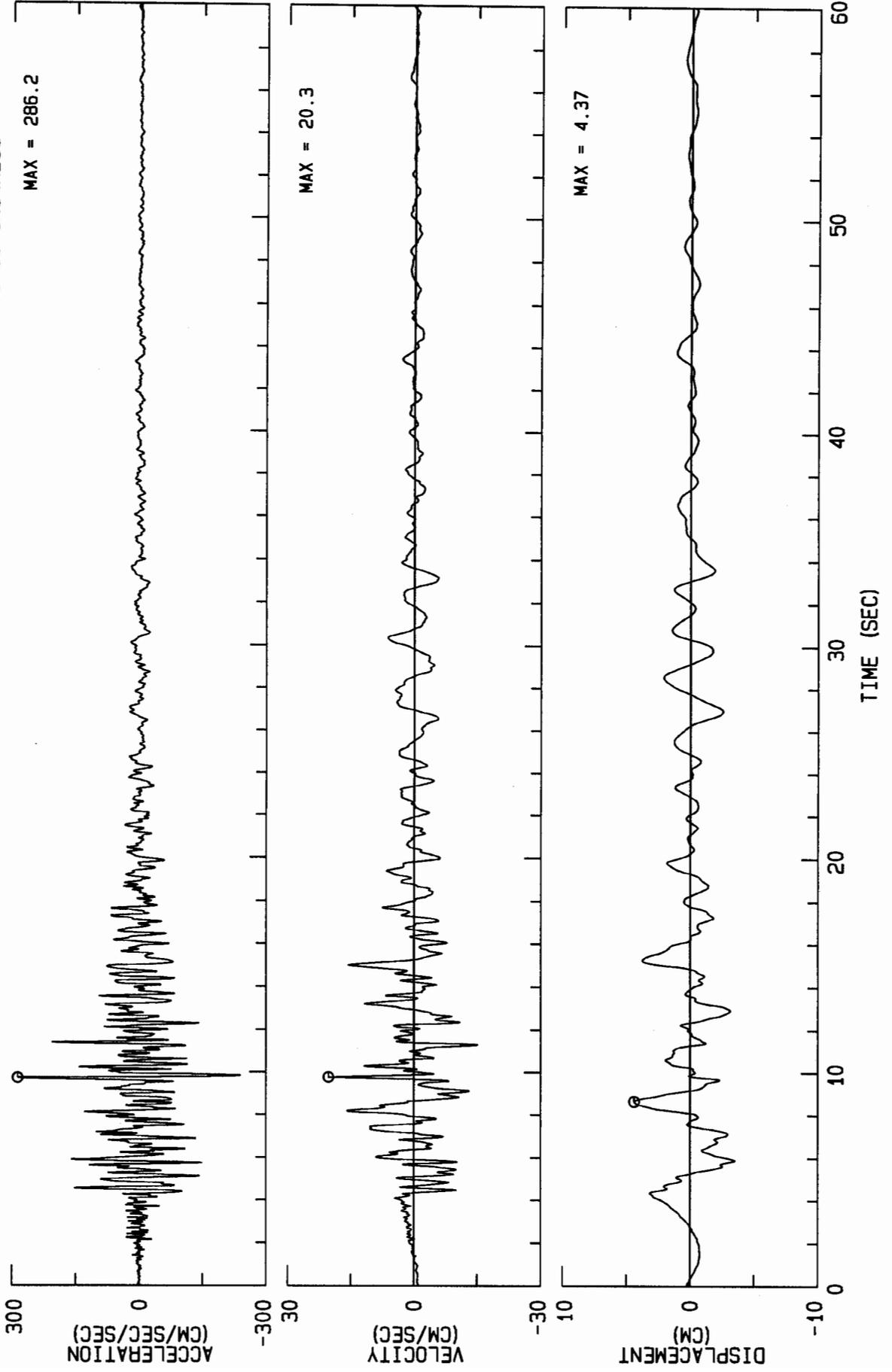


NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
MOORPARK

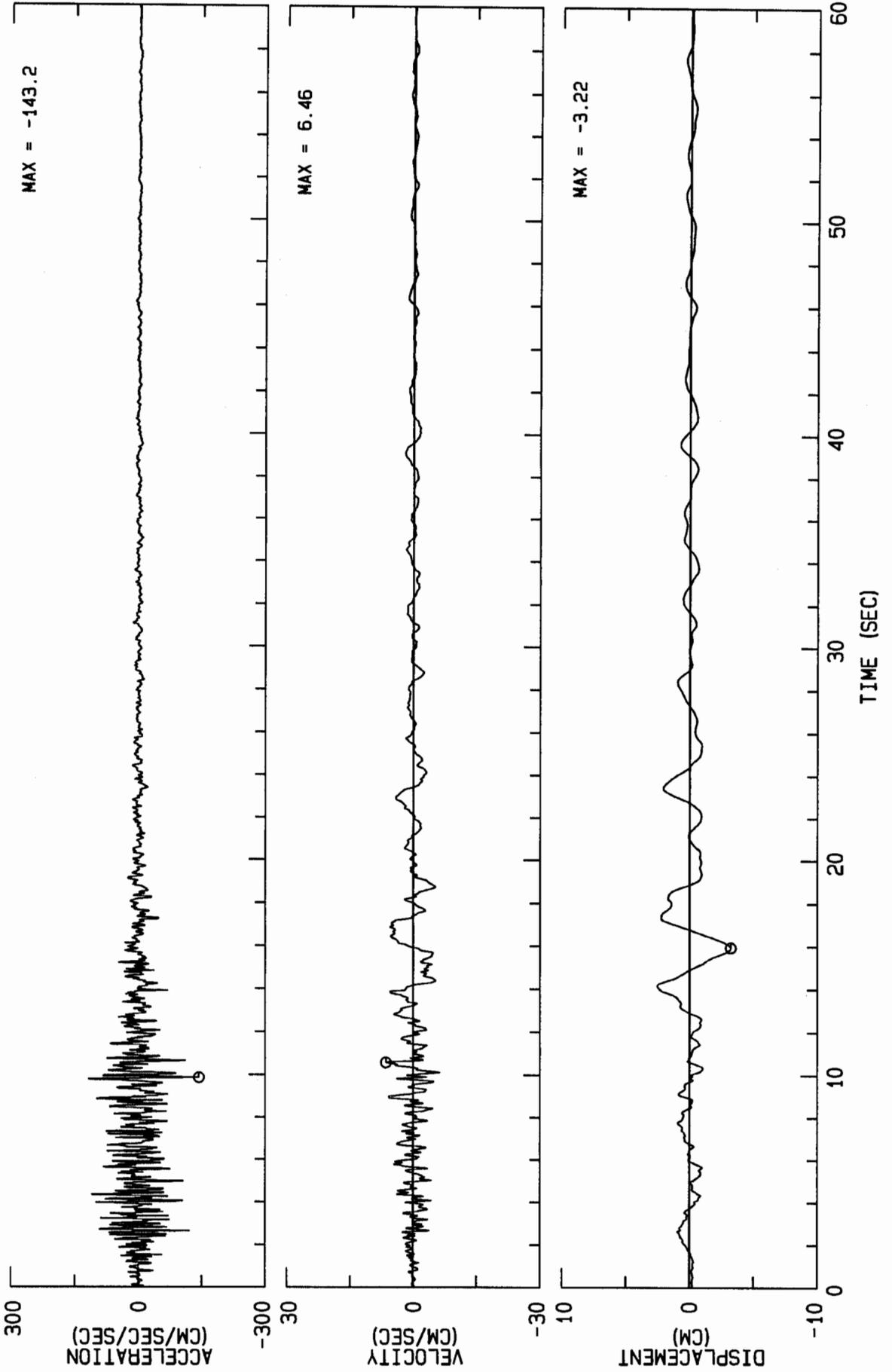
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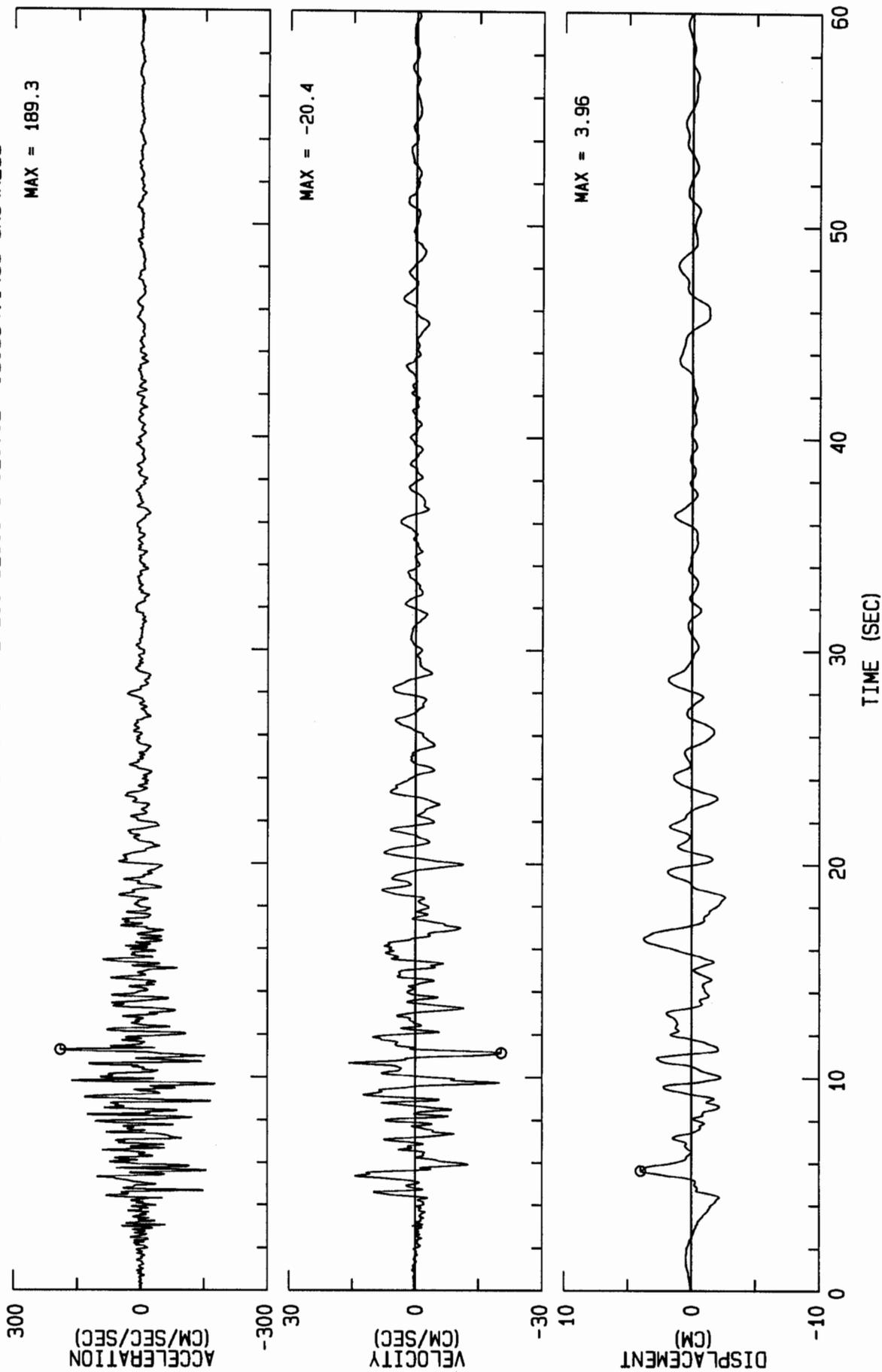
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
MOORPARK    CHN 1: 180 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .08-.16 TO 23.0-25.0 HZ.    24283-S2509-94020.02    030394.1458-QN94A283



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
MOORPARK    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .08-.16 TO 23.0-25.0 HZ.    24283-S2509-94020.02    030394.1458-QN94A283



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
MOORPARK    CHN 3: 90 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .08-.16 TO 23.0-25.0 HZ.    24283-S2509-94020.02    030394.1458-QN94A283

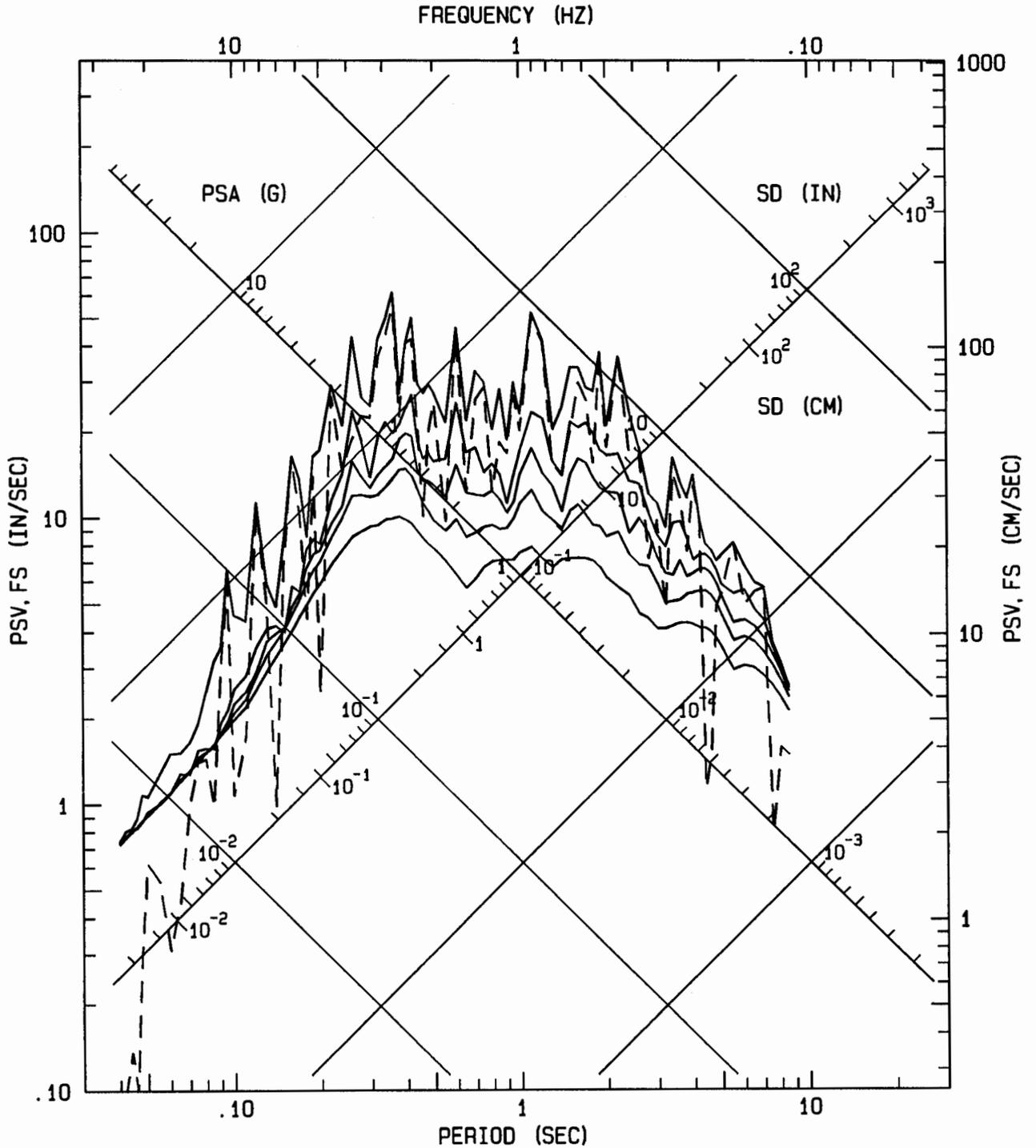


NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04: 31 PST  
 MOORPARK

CHN 1: 180 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .08-.16 TO 23.0-25.0 HZ.  
 24283-S2509-94020.02    032394.0856-0N94A283

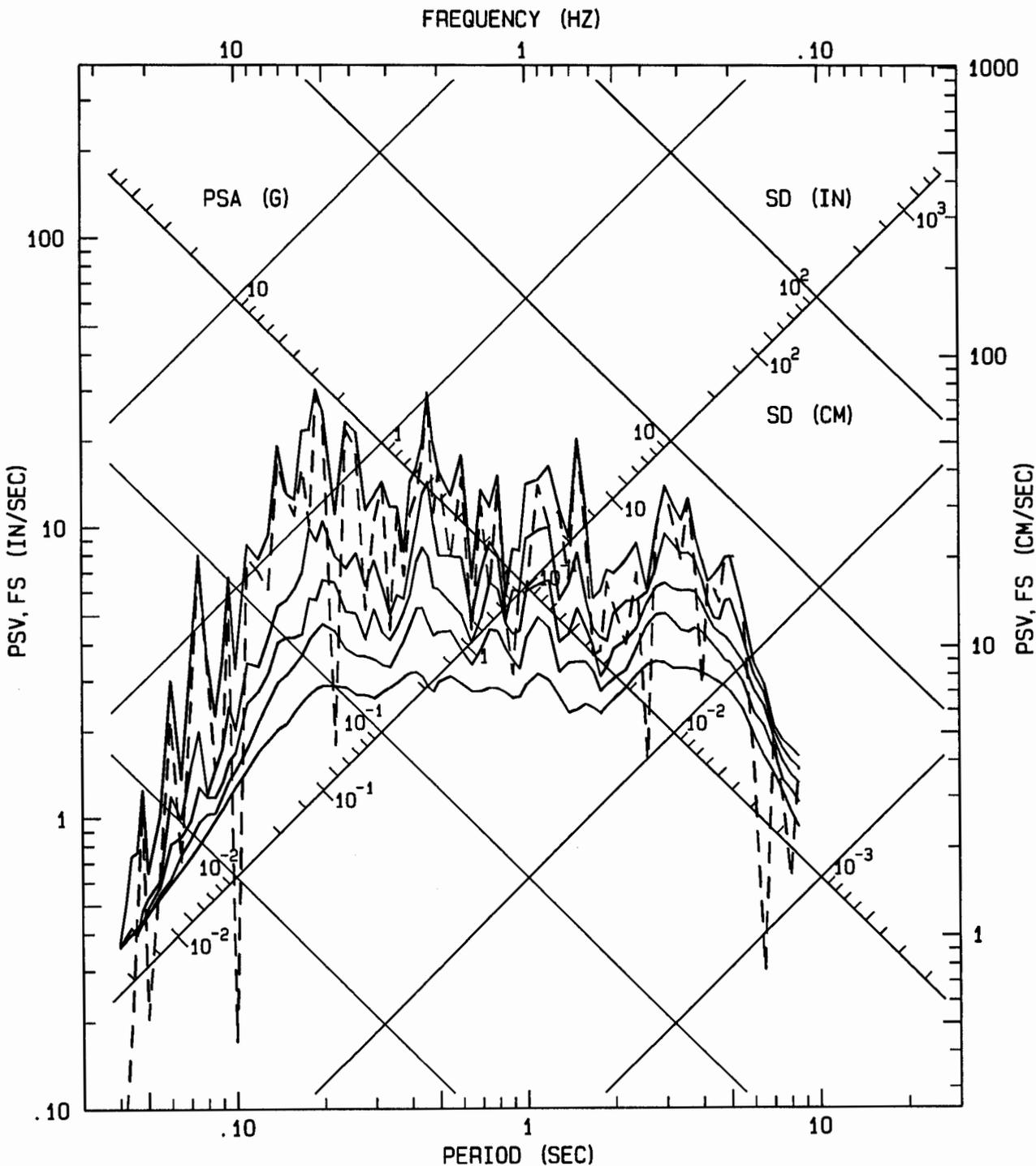
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 MOORPARK  
 CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .08-.16 TO 23.0-25.0 HZ.  
 24283-S2509-94020.02 032394.0856-QN94A283

— RESPONSE SPECTRA: PSV, PSA & SD      - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



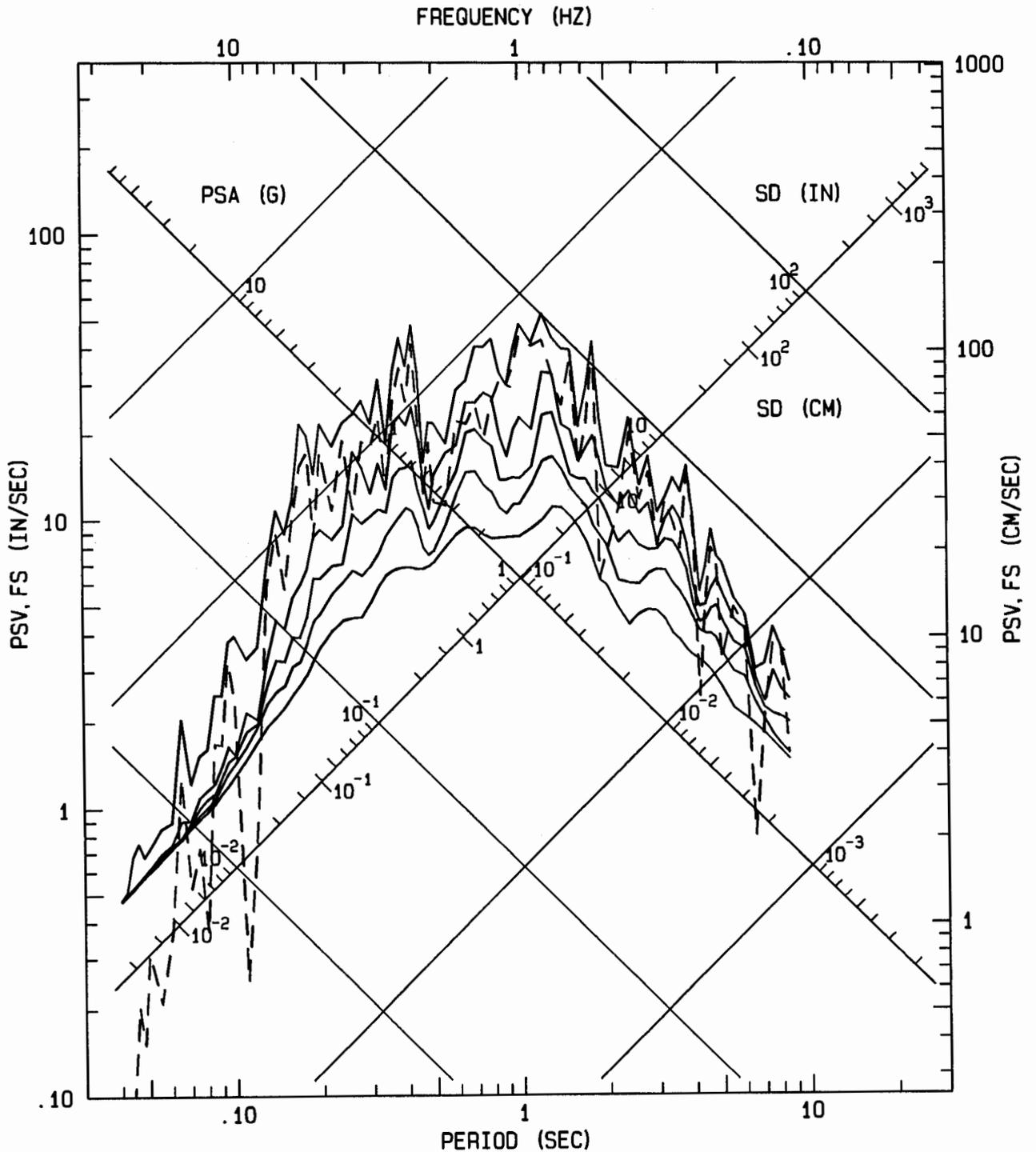
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04: 31 PST  
 MOORPARK

CHN 3: 90 DEG

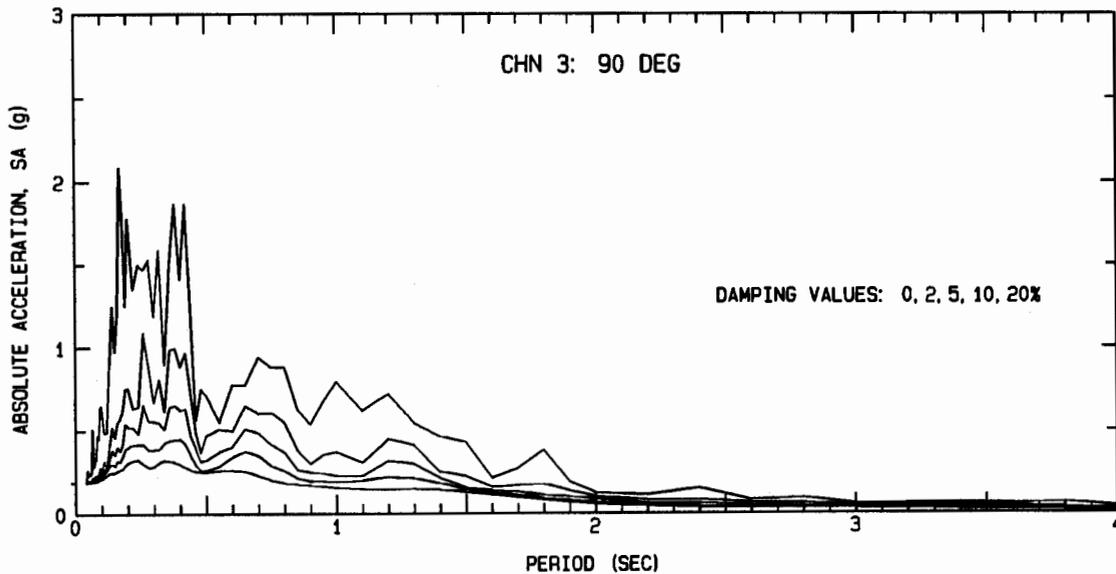
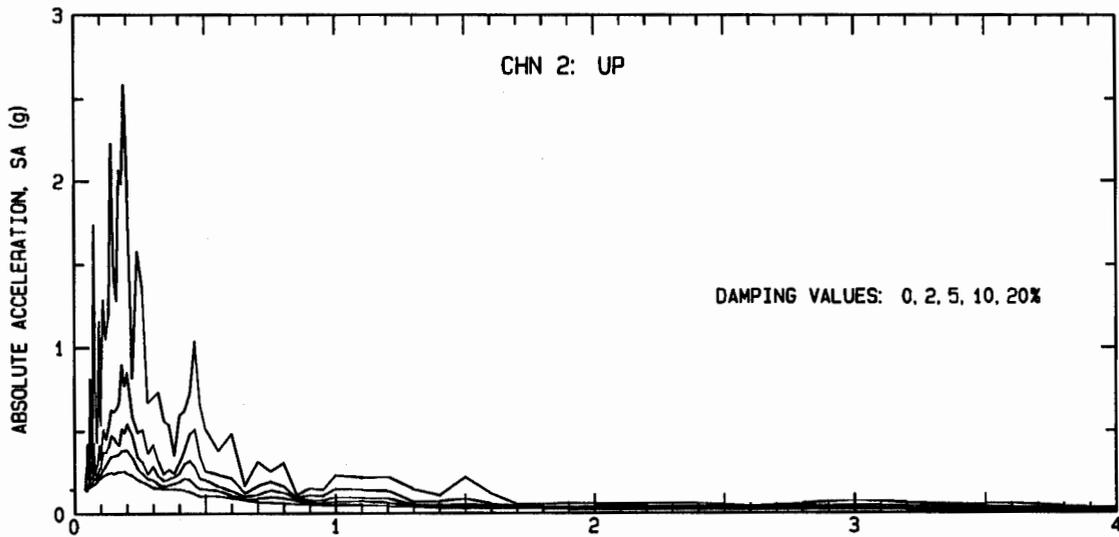
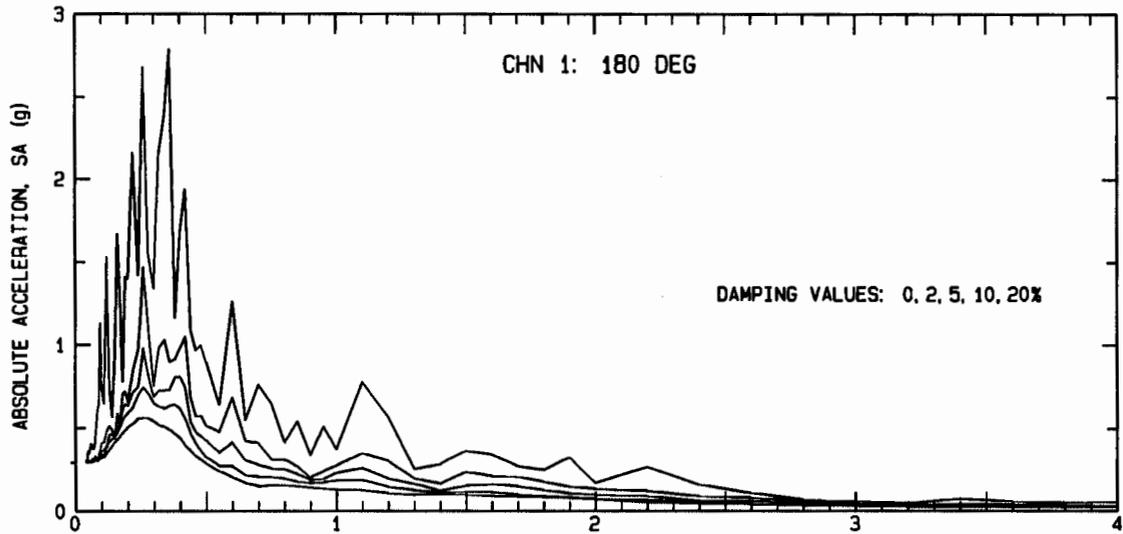
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .08-.16 TO 23.0-25.0 HZ.

24283-S2509-94020.02    032394.0856-QN94A283

— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
MOORPARK  
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .08-.16 TO 23.0-25.0 HZ.  
24283-S2509-94020.02    032394.0B56-QN94A283

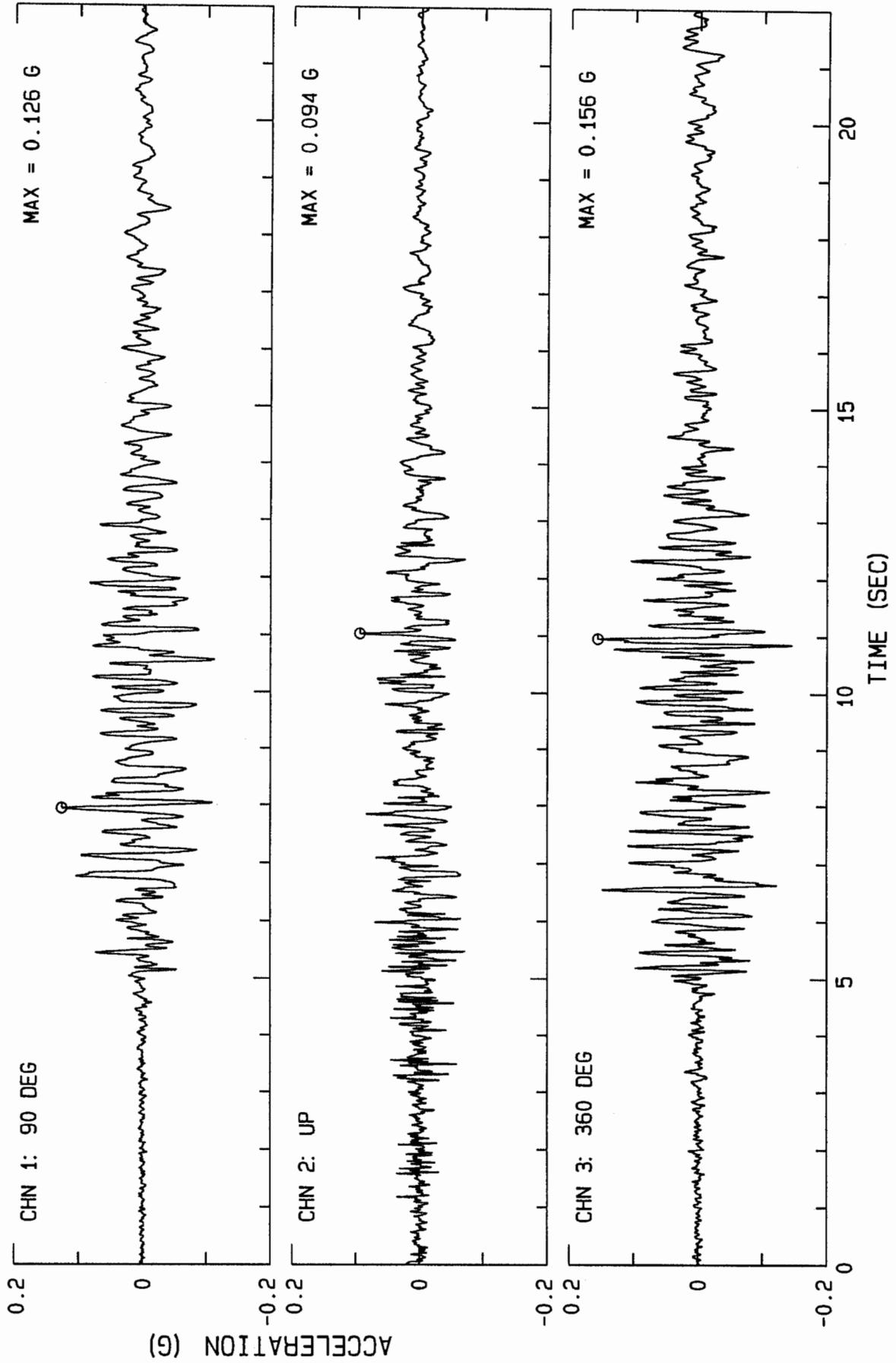




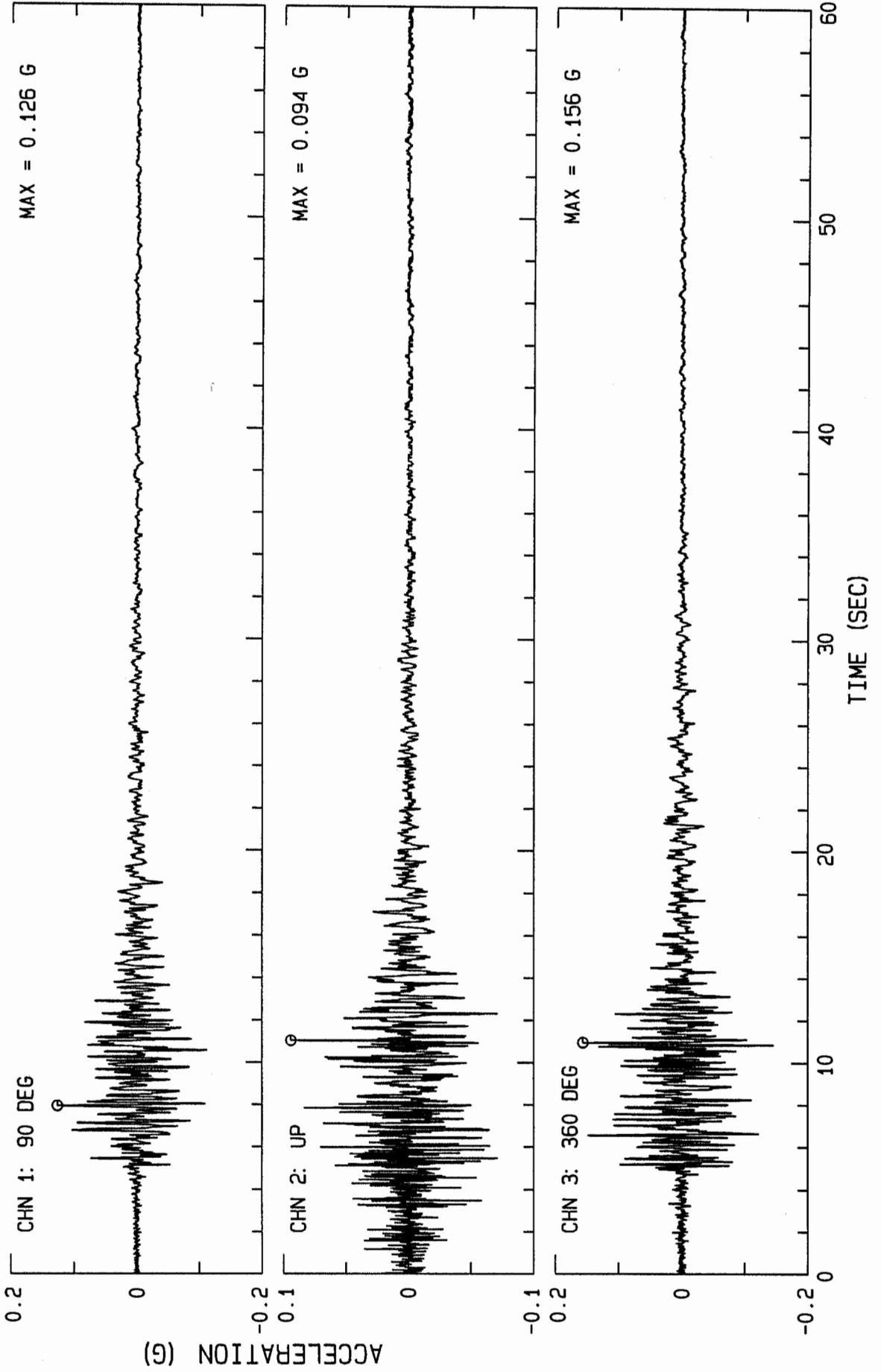
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST

SAN MARINO - SOUTHWESTERN ACADEMY

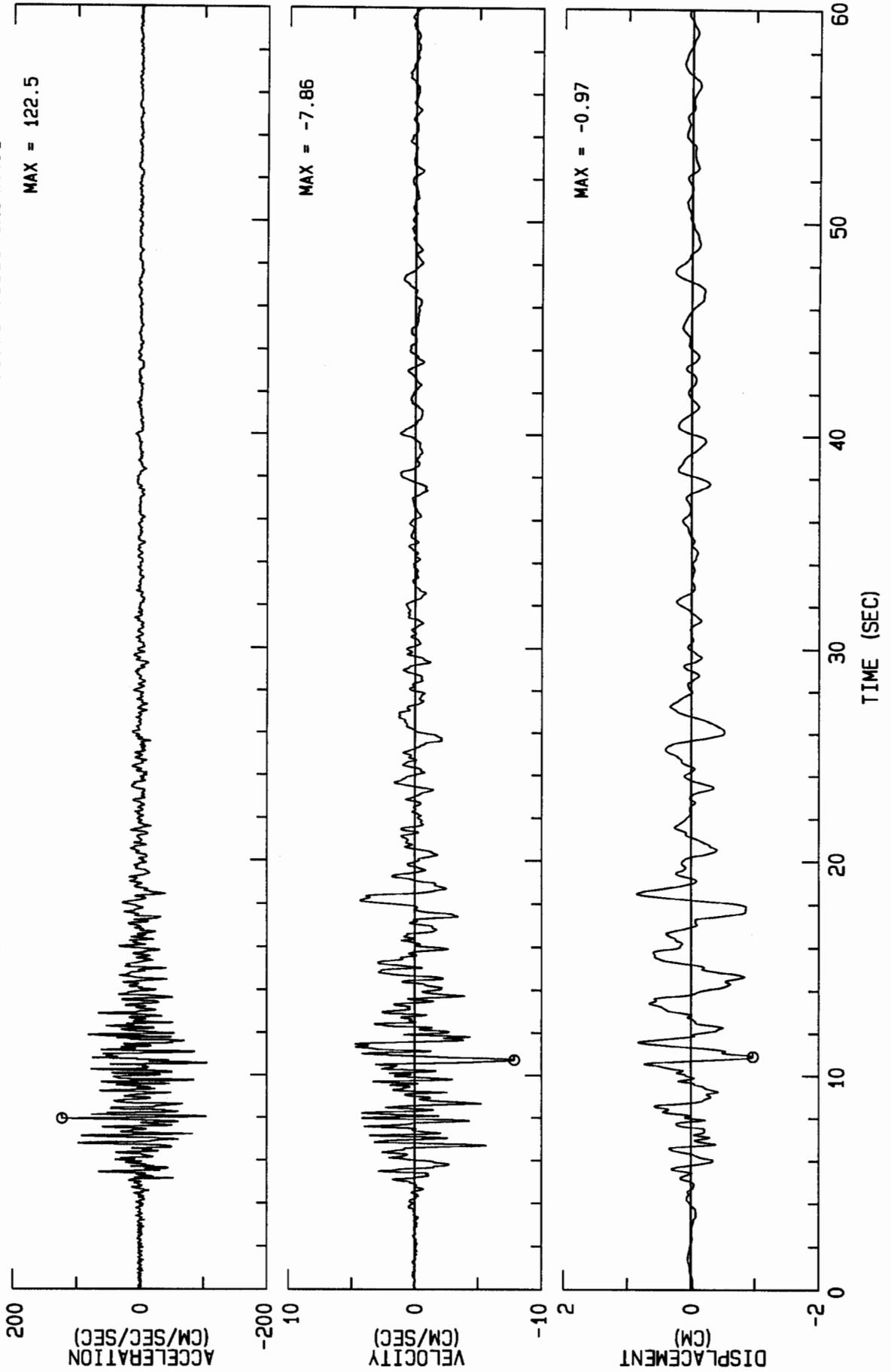
UNCORRECTED ACCELEROGRAM    24401-S0760-94019.02    030394.1353-QN94A401



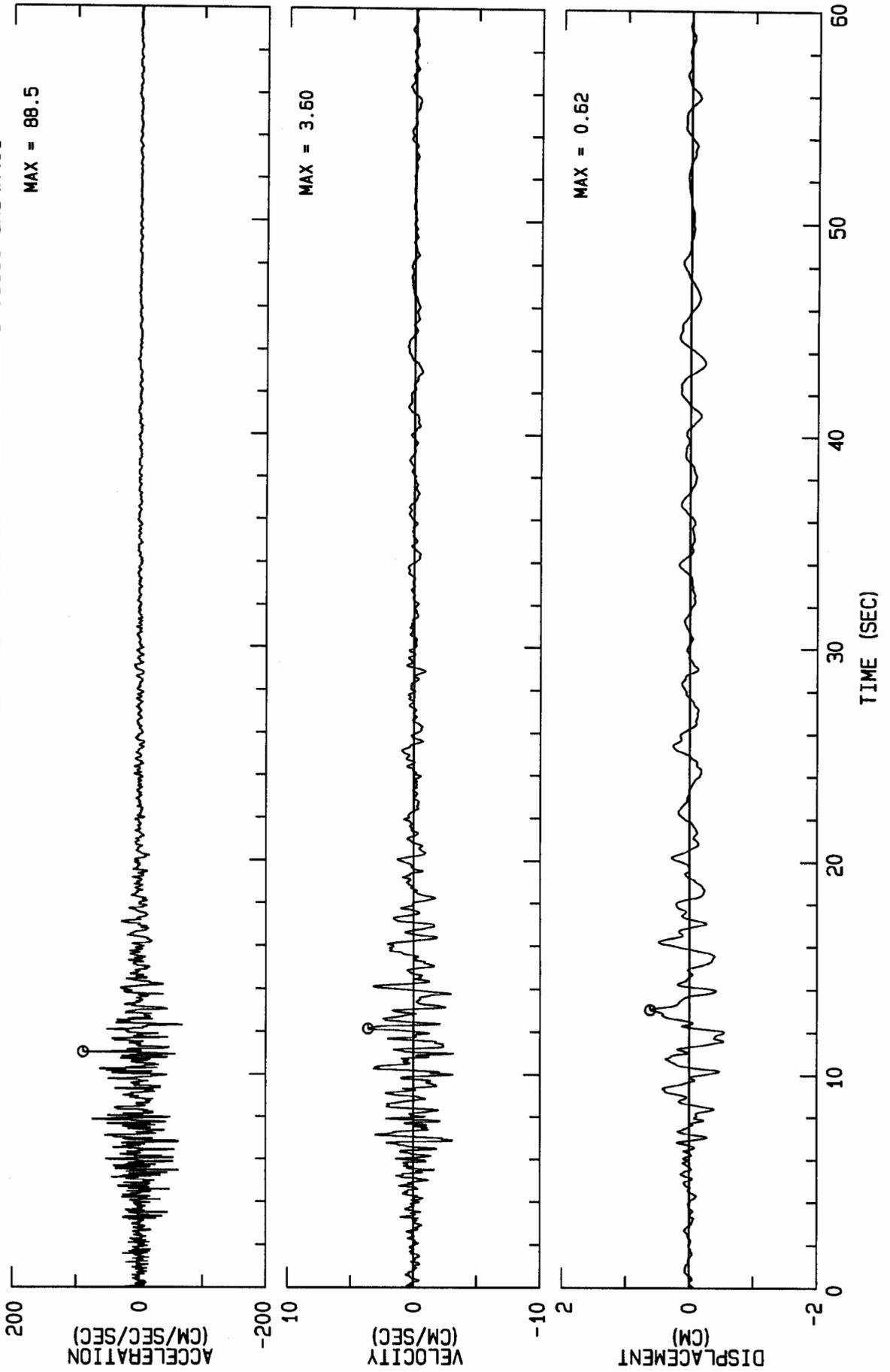
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
SAN MARINO - SOUTHWESTERN ACADEMY  
UNCORRECTED ACCELEROGRAM    24401-S0760-94019.02    030394.1353-QN94A401



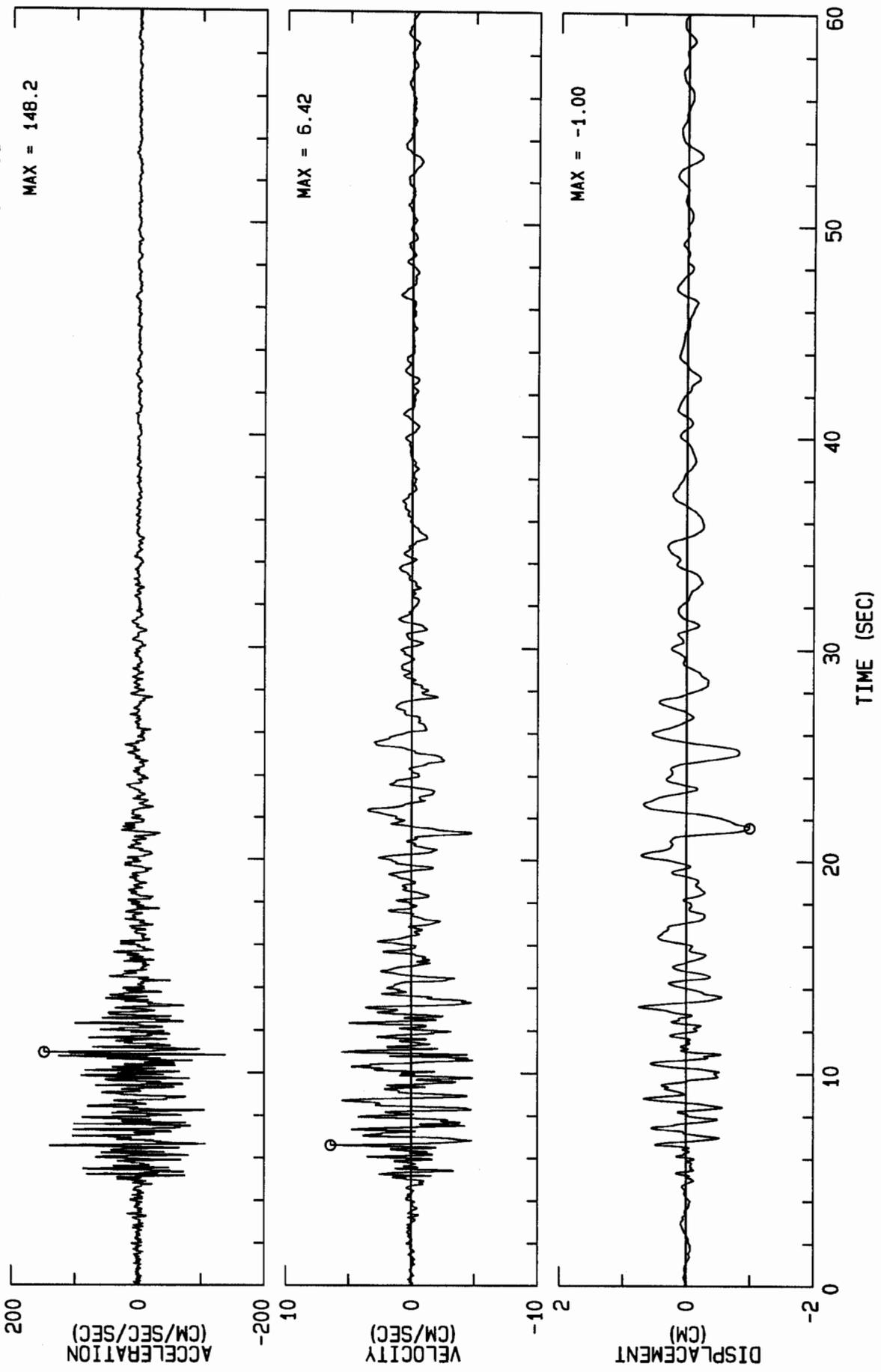
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
SAN MARINO - SOUTHWESTERN ACADEMY    CHN 1: 90 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    24401-S0750-94019.02    030794.1158-GN94A401



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
SAN MARINO - SOUTHWESTERN ACADEMY    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    24401-S0760-94019.02    030794.1158-GN94A401



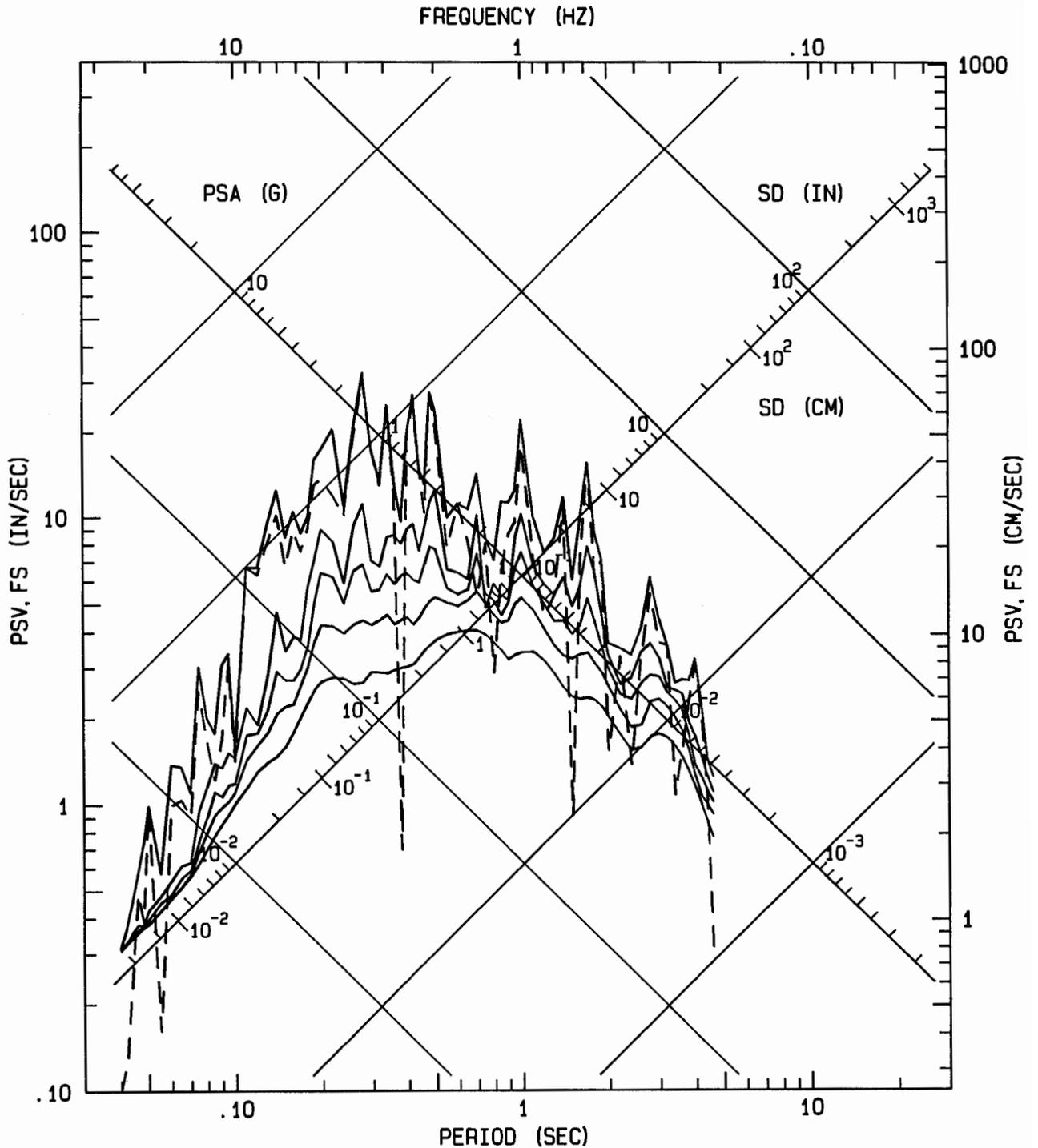
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
SAN MARINO - SOUTHWESTERN ACADEMY    CHN 3: 360 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    24401-S0760-94019.02    030794.1158-GN94A401



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04: 31 PST  
 SAN MARINO - SOUTHWESTERN ACADEMY  
 CHN 1: 90 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 24401-S0760-94019.02    032394.0945-GN94A401

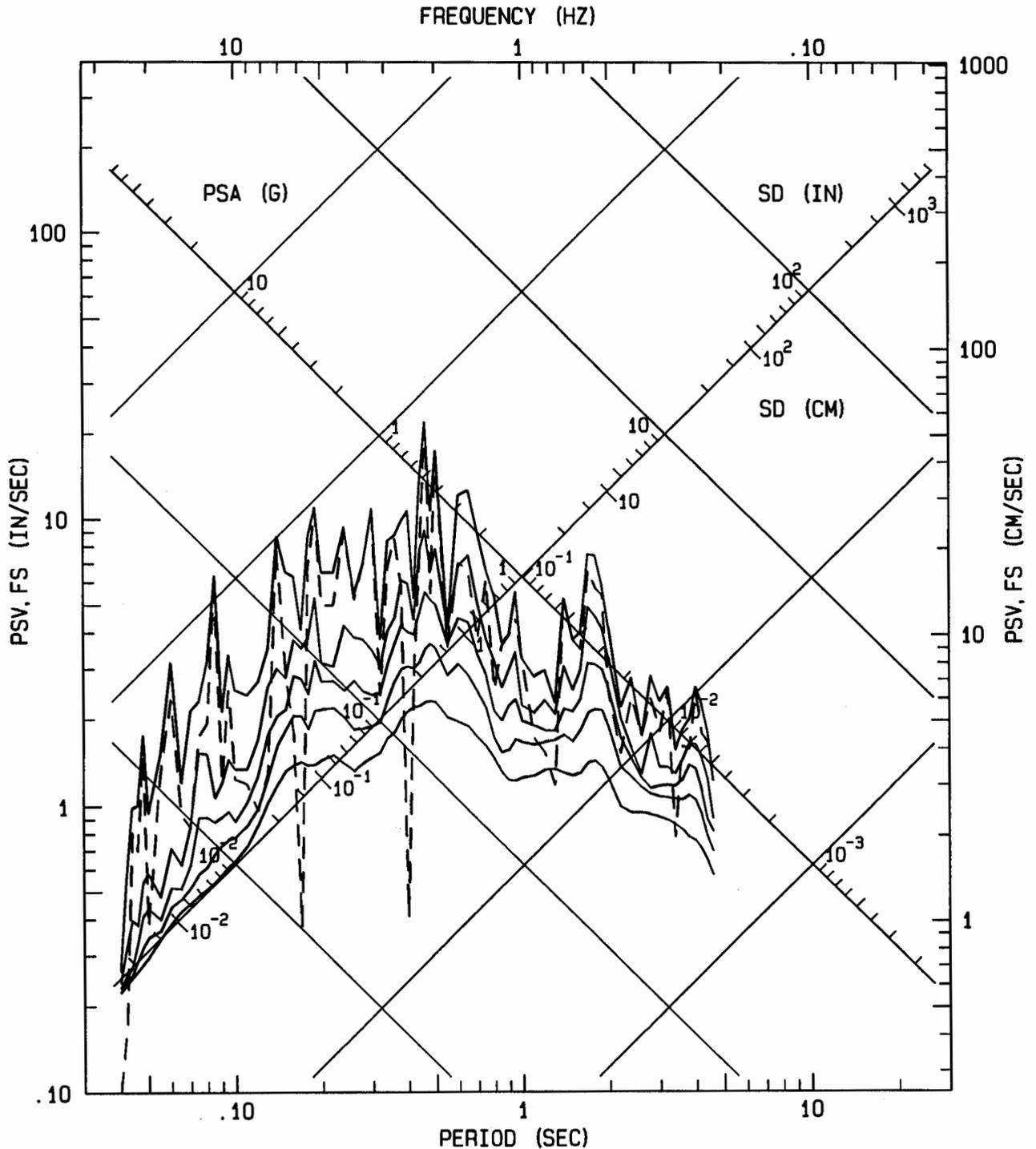
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 SAN MARINO - SOUTHWESTERN ACADEMY  
 CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 24401-S0760-94019.02    032394.0945-QN94A401

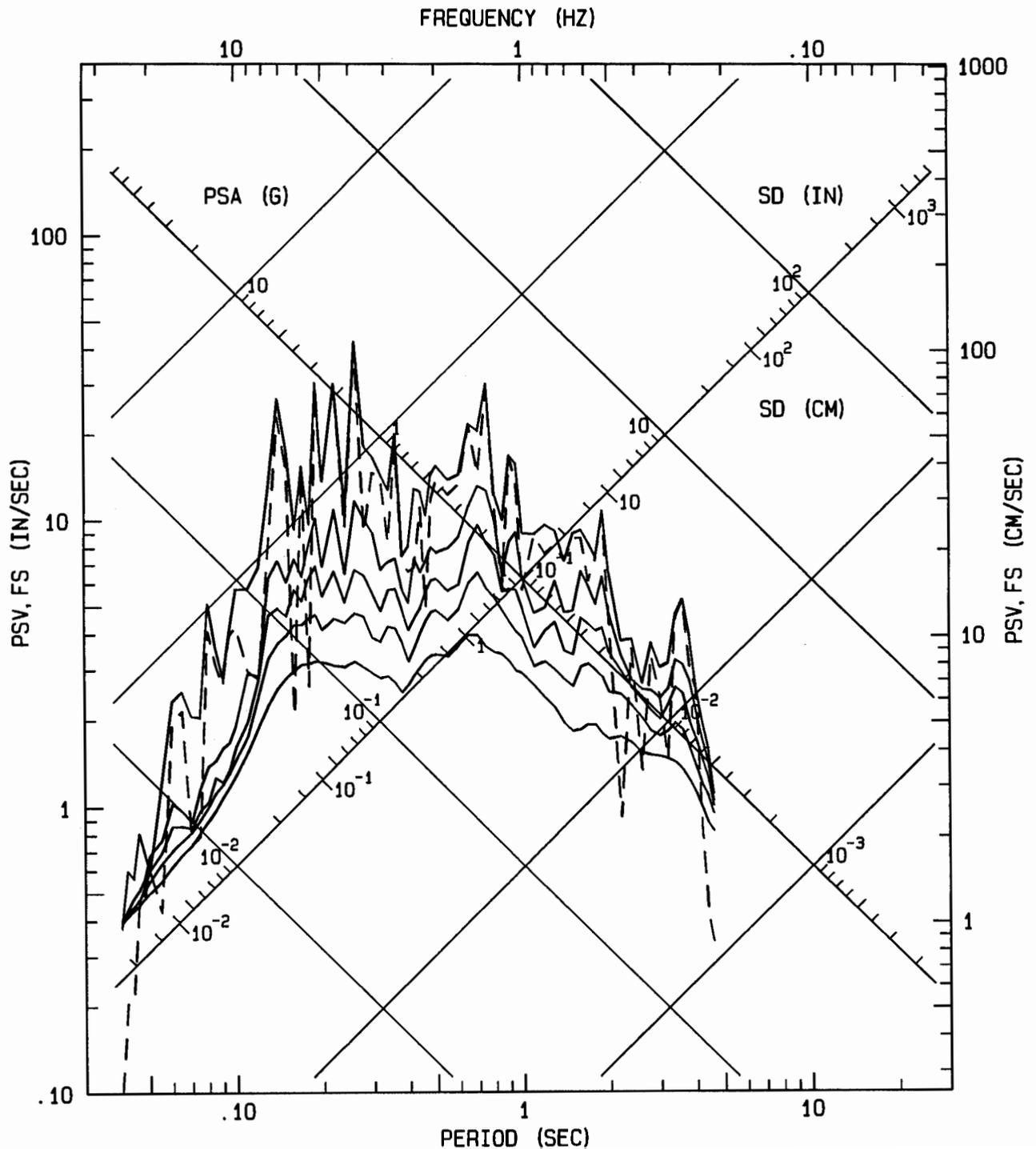
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



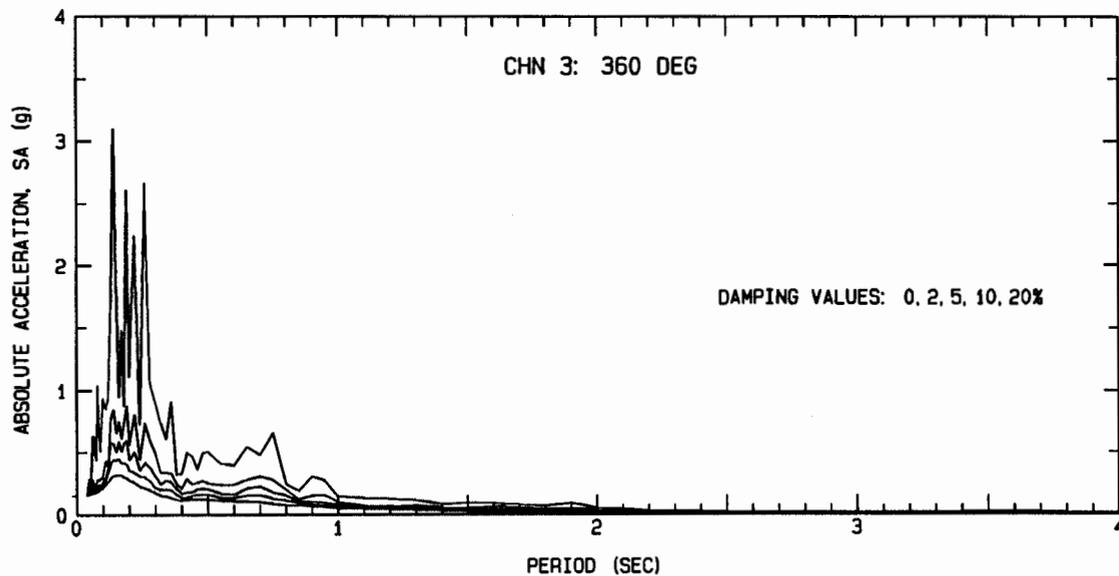
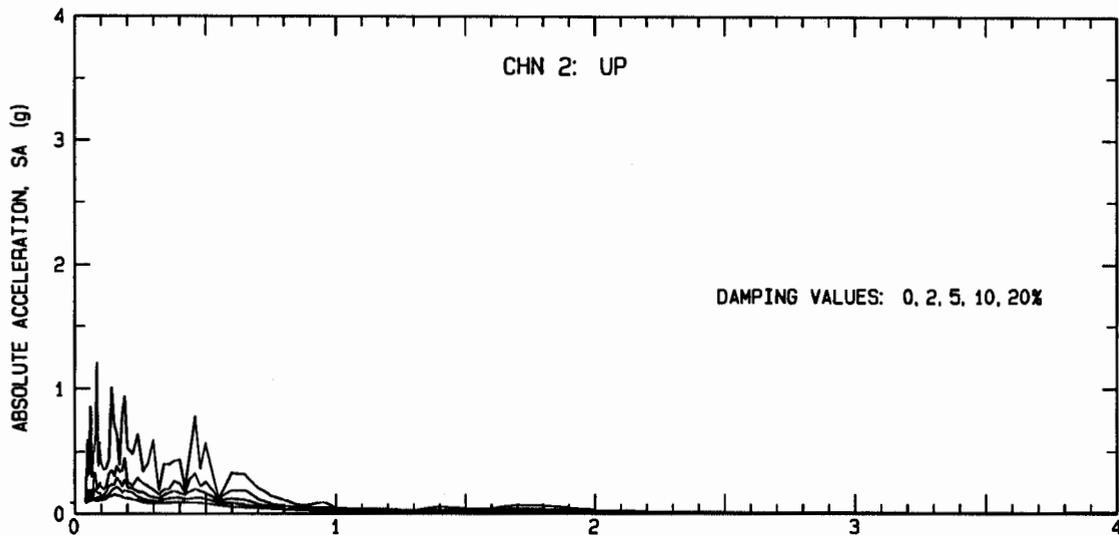
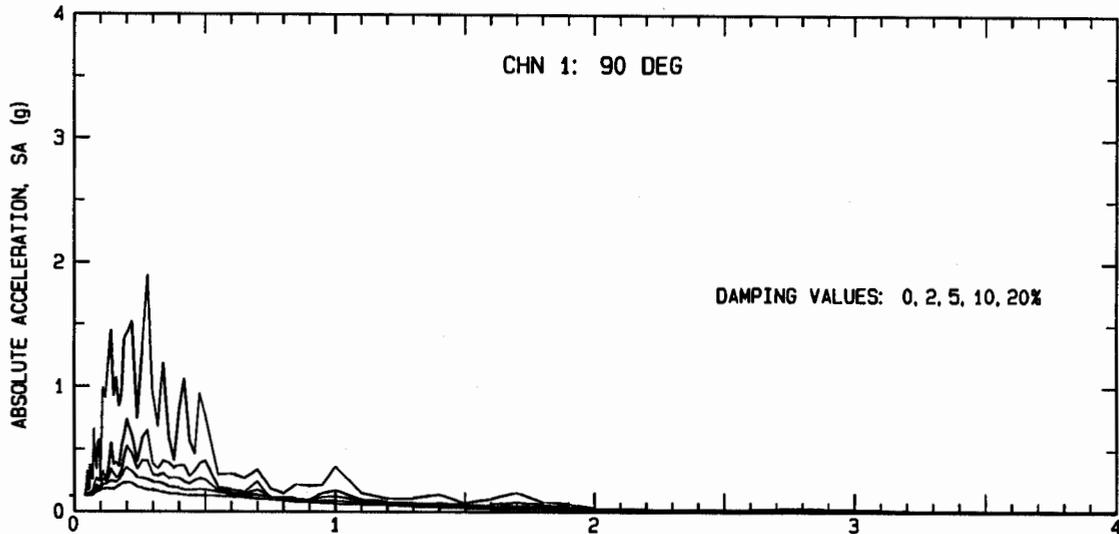
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 SAN MARINO - SOUTHWESTERN ACADEMY  
 CHN 3: 360 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 24401-S0760-94019.02 032394.0945-GN94A401

— RESPONSE SPECTRA: PSV, PSA & SD      - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



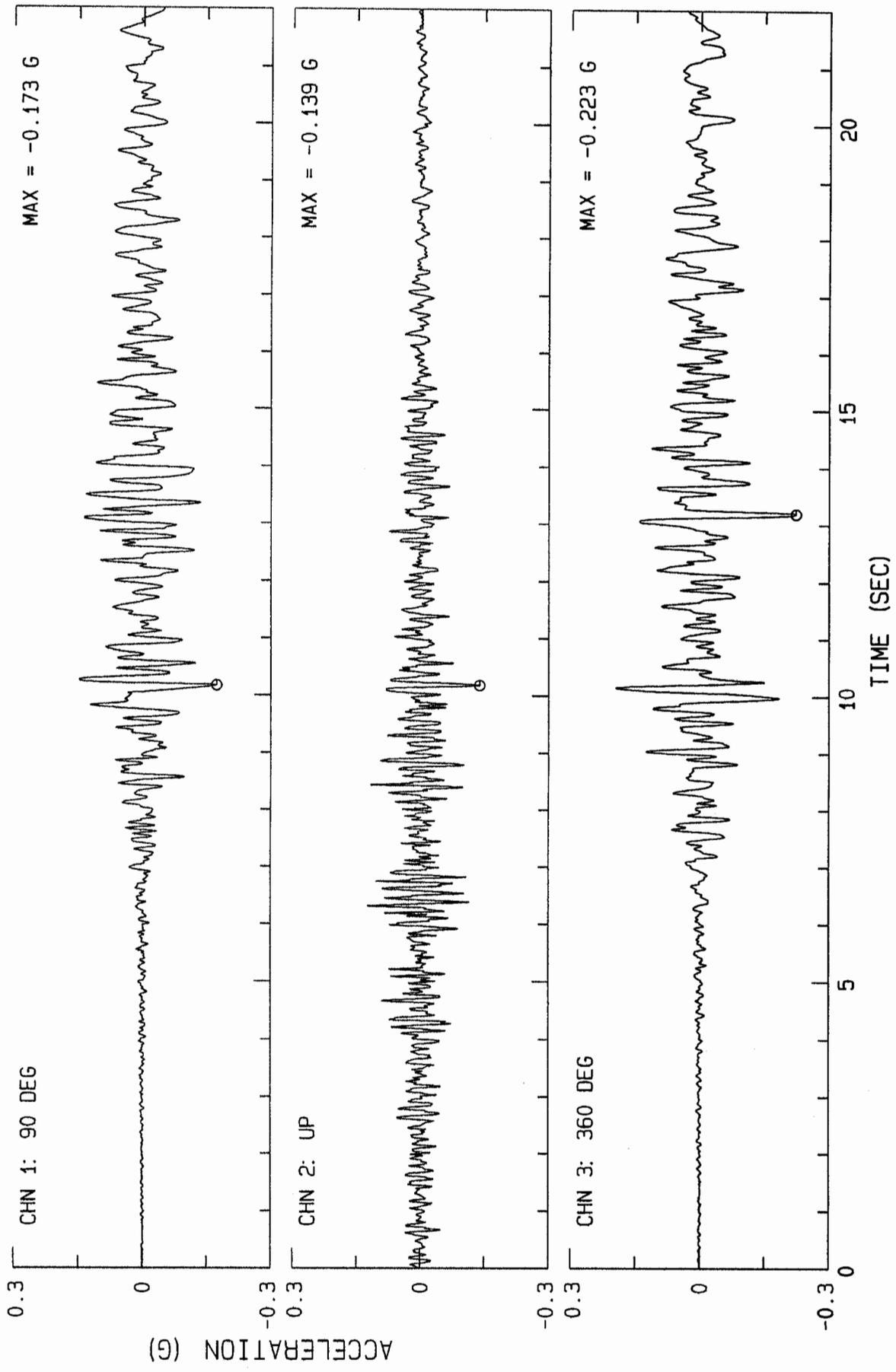
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
SAN MARINO - SOUTHWESTERN ACADEMY  
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
24401-S0760-94019.02    032394.0945-QN94A401



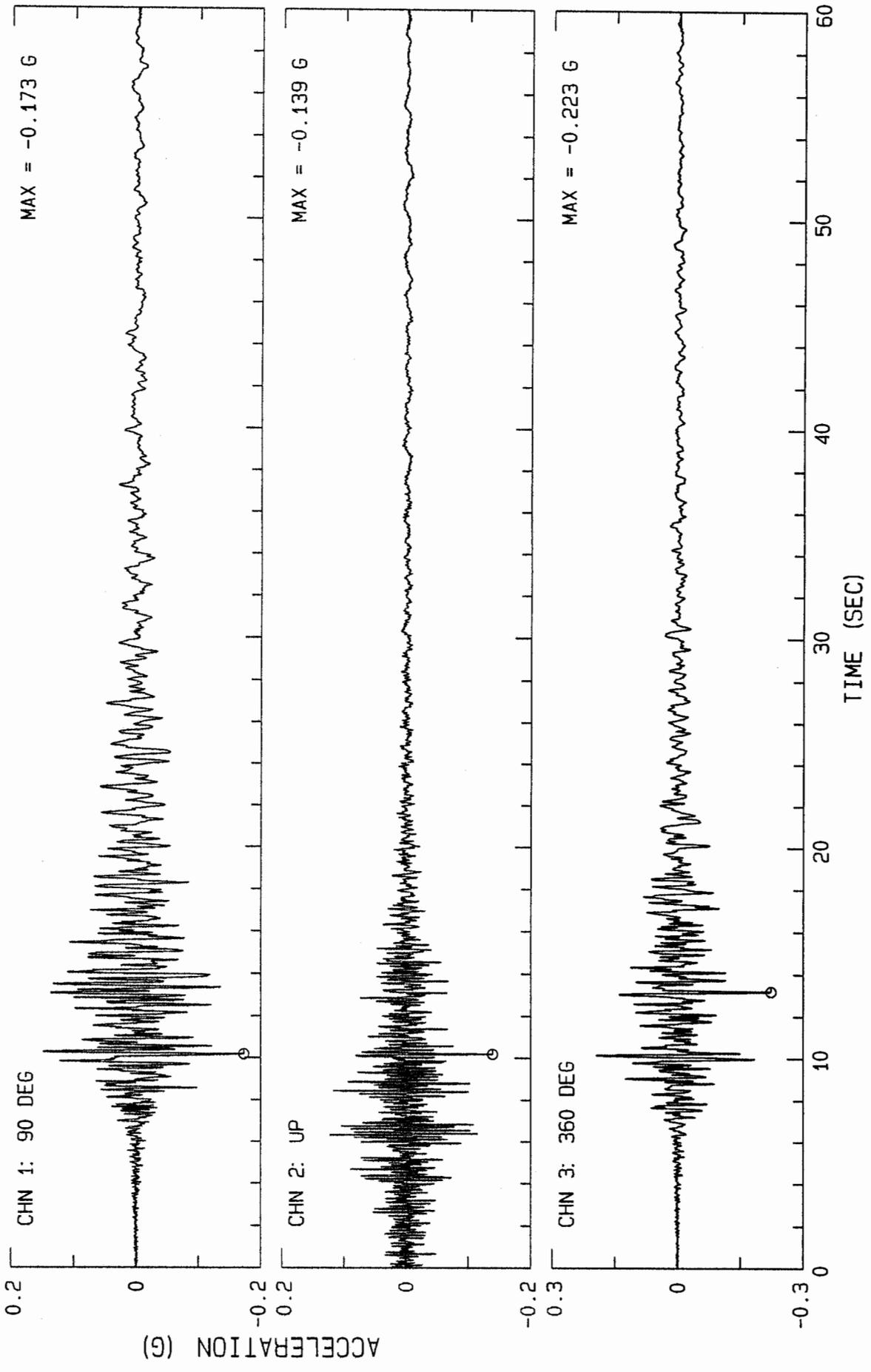


NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04: 31 PST  
DOWNEY - COUNTY MAINT. BLDG.

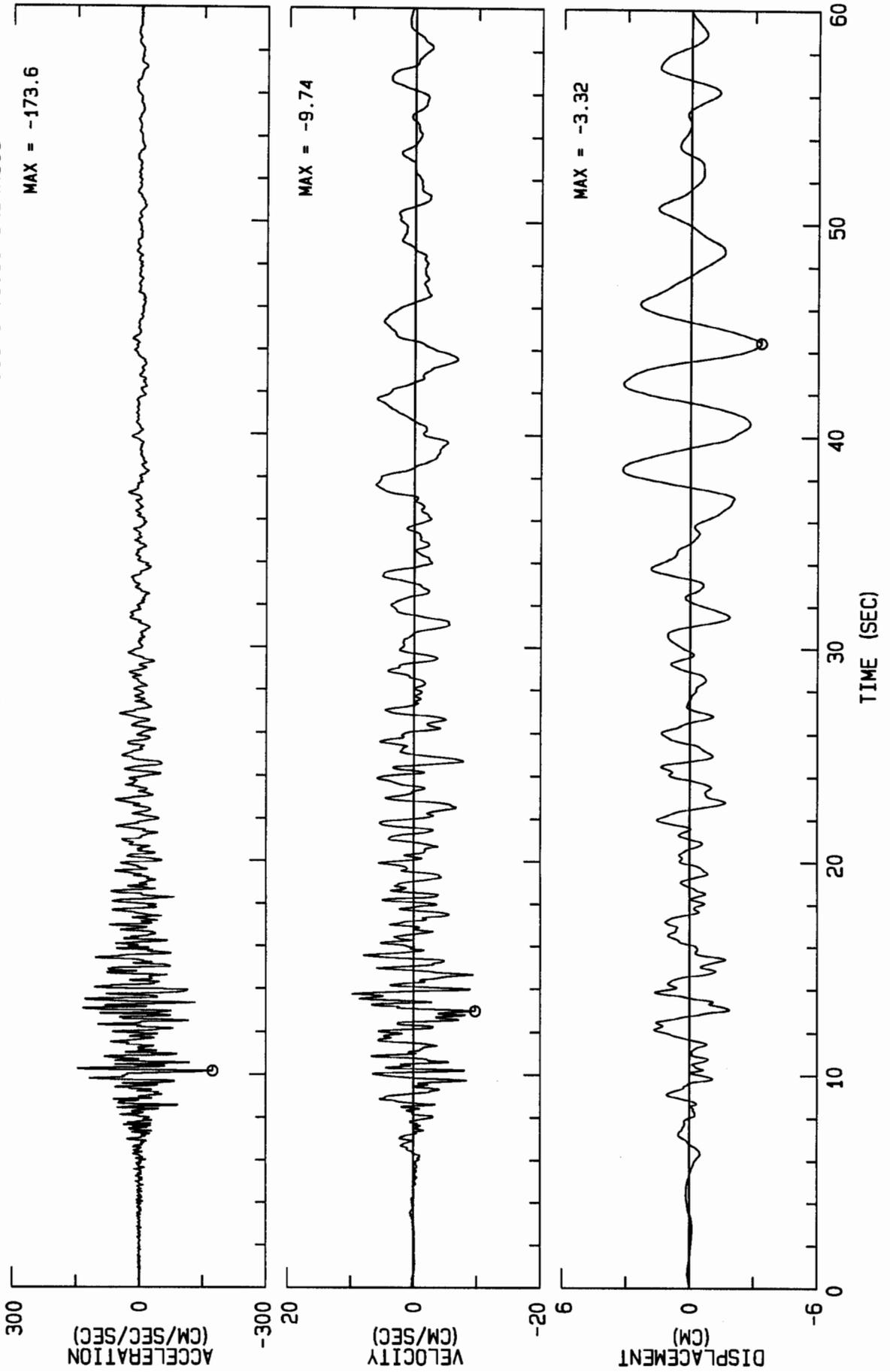
UNCORRECTED ACCELEROGRAM 14368-S1607-94021.02 031494.1049-GN94A368



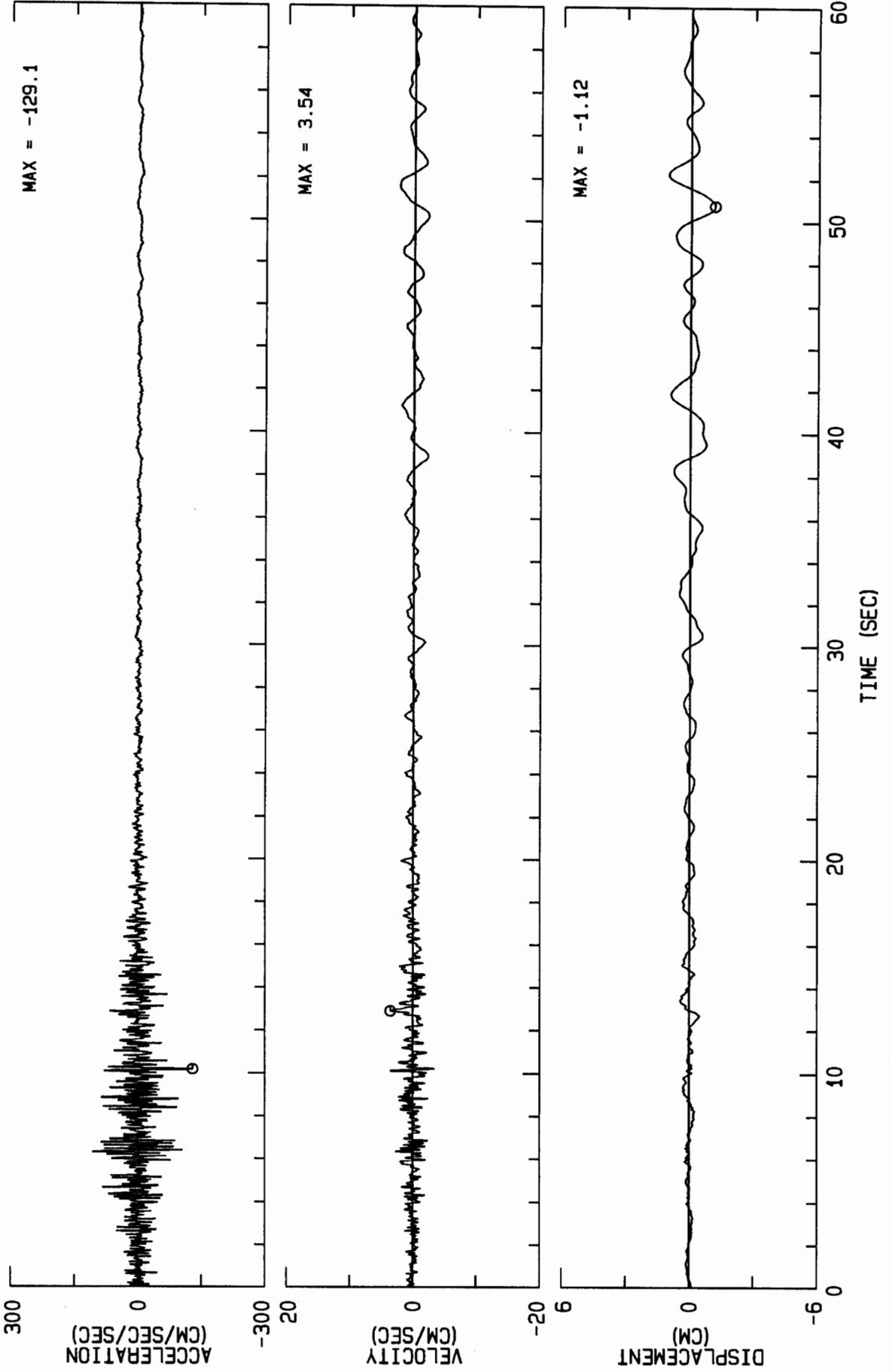
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
DOWNNEY - COUNTY MAINT. BLDG.  
UNCORRECTED ACCELEROGRAM    14368-S1607-94021.02    031494.1049-0N94A368



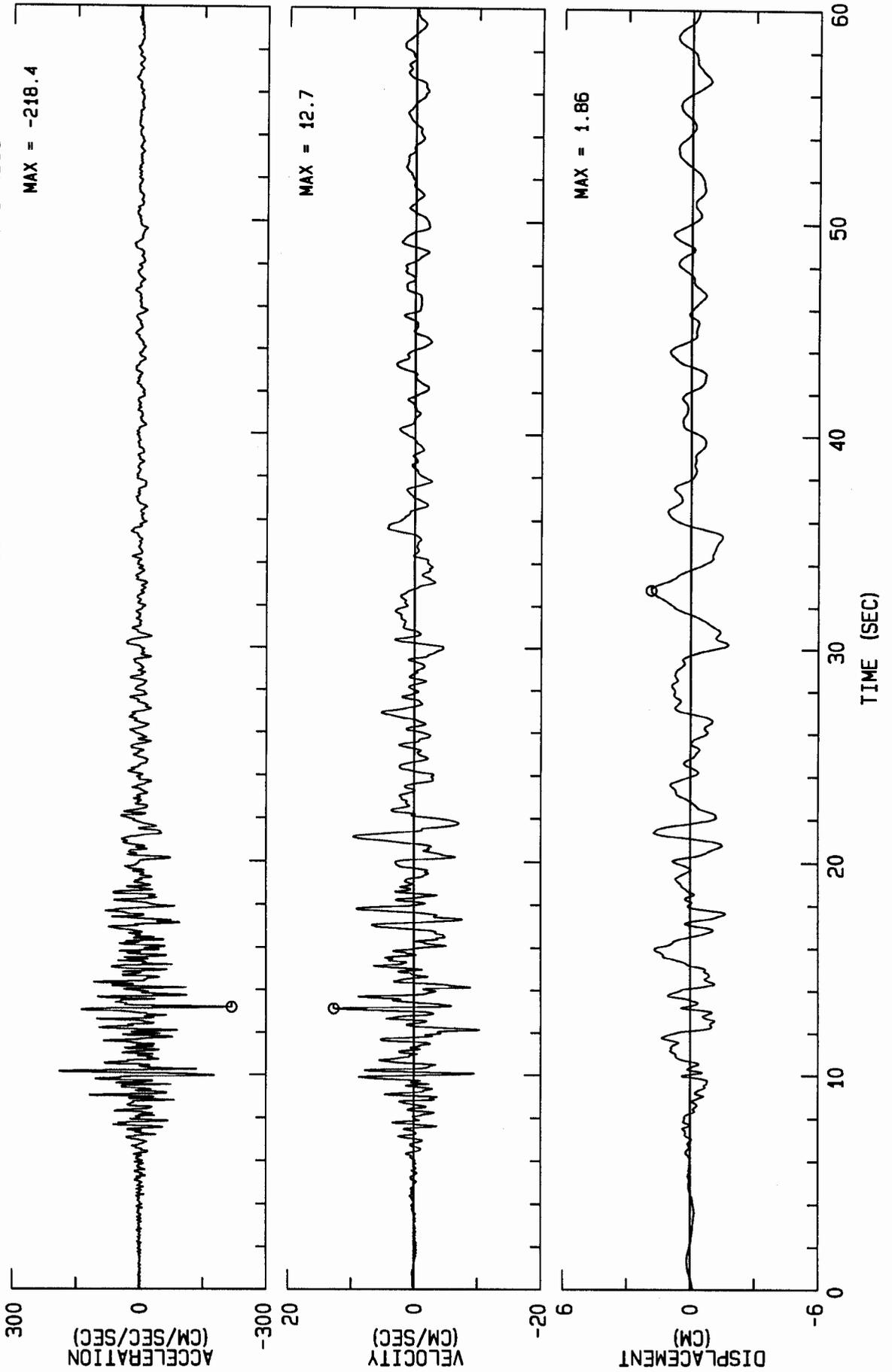
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
DOWNNEY - COUNTY MAINT. BLDG.    CHN 1: 90 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .10-.20 TO 23.0-25.0 HZ.    14368-S1607-94021.02    031494.1059-QN94A368



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
DOWNEY - COUNTY MAINT. BLDG.    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .10-.20 TO 23.0-25.0 HZ.    14368-S1607-94021.02    031494.1059-GN94A368



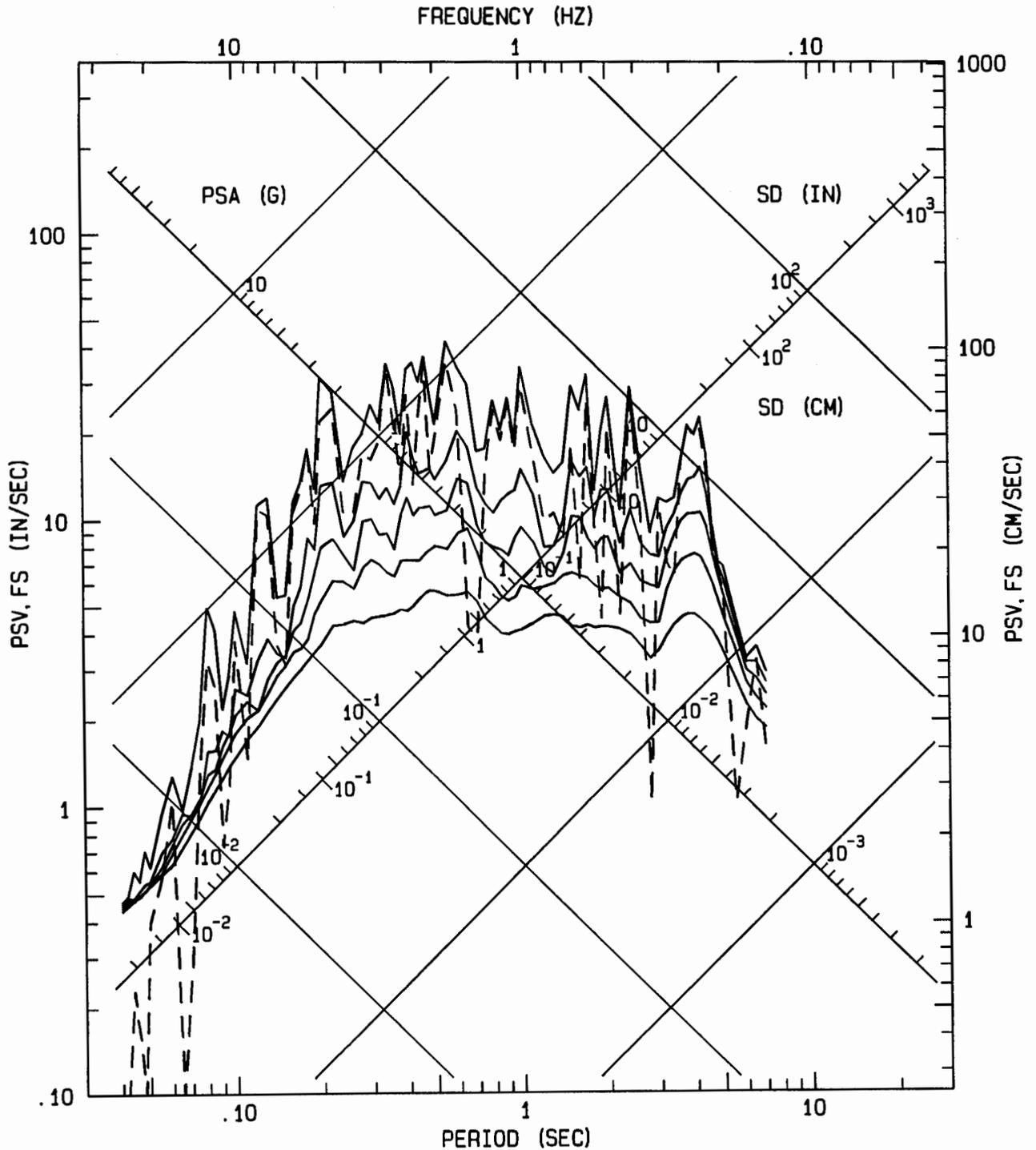
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
DOWNNEY - COUNTY MAINT. BLDG.    CHN 3: 360 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .10-.20 TO 23.0-25.0 HZ.    14368-S1607-94021.02    031494.1059-QN94A368



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04: 31 PST  
 DOWNEY - COUNTY MAINT. BLDG.  
 CHN 1: 90 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .10-.20 TO 23.0-25.0 HZ.  
 14368-S1607-94021.02    032394.1022-QN94A368

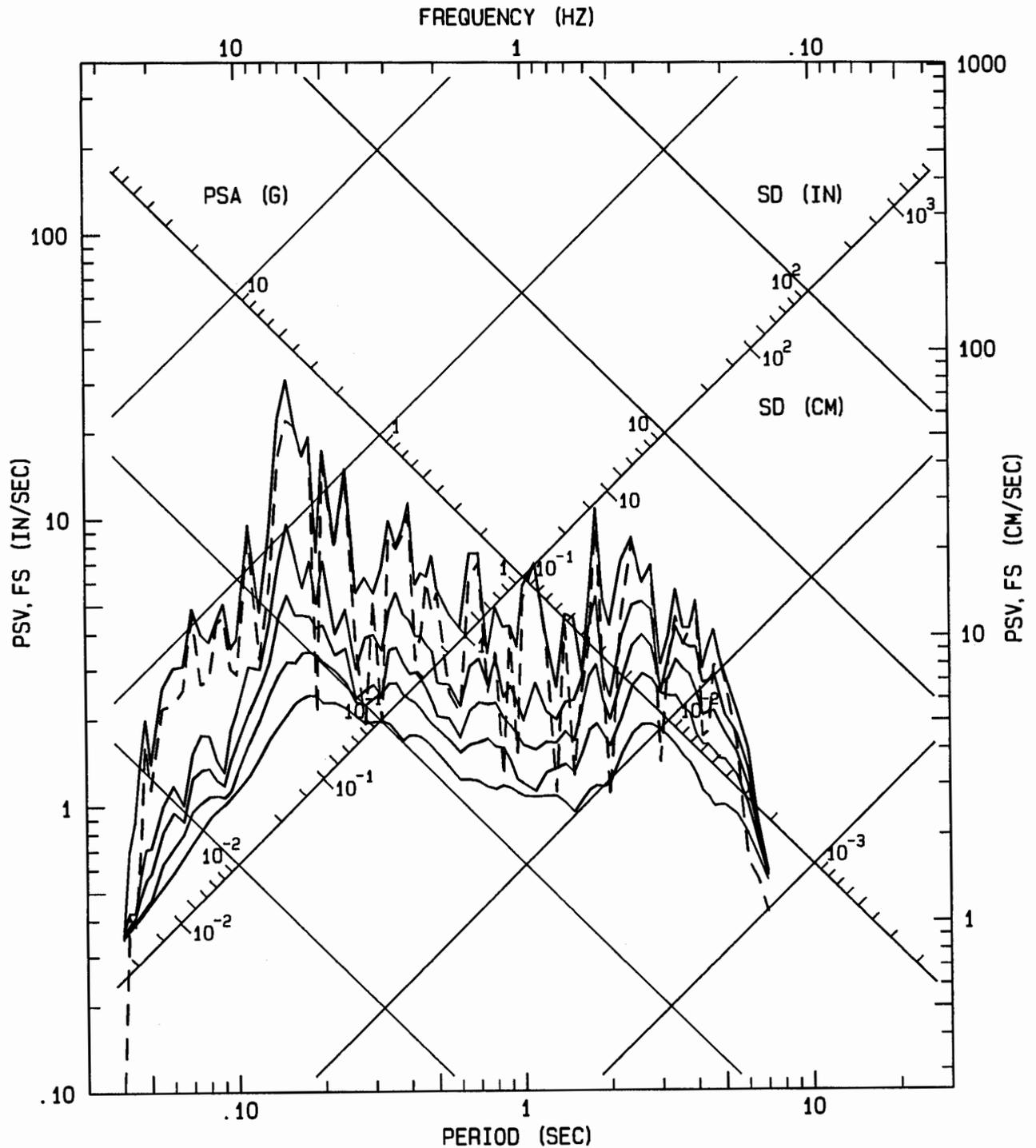
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 DOWNEY - COUNTY MAINT. BLDG.  
 CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .10-.20 TO 23.0-25.0 HZ.  
 14368-S1607-94021.02 032394.1022-QN94A368

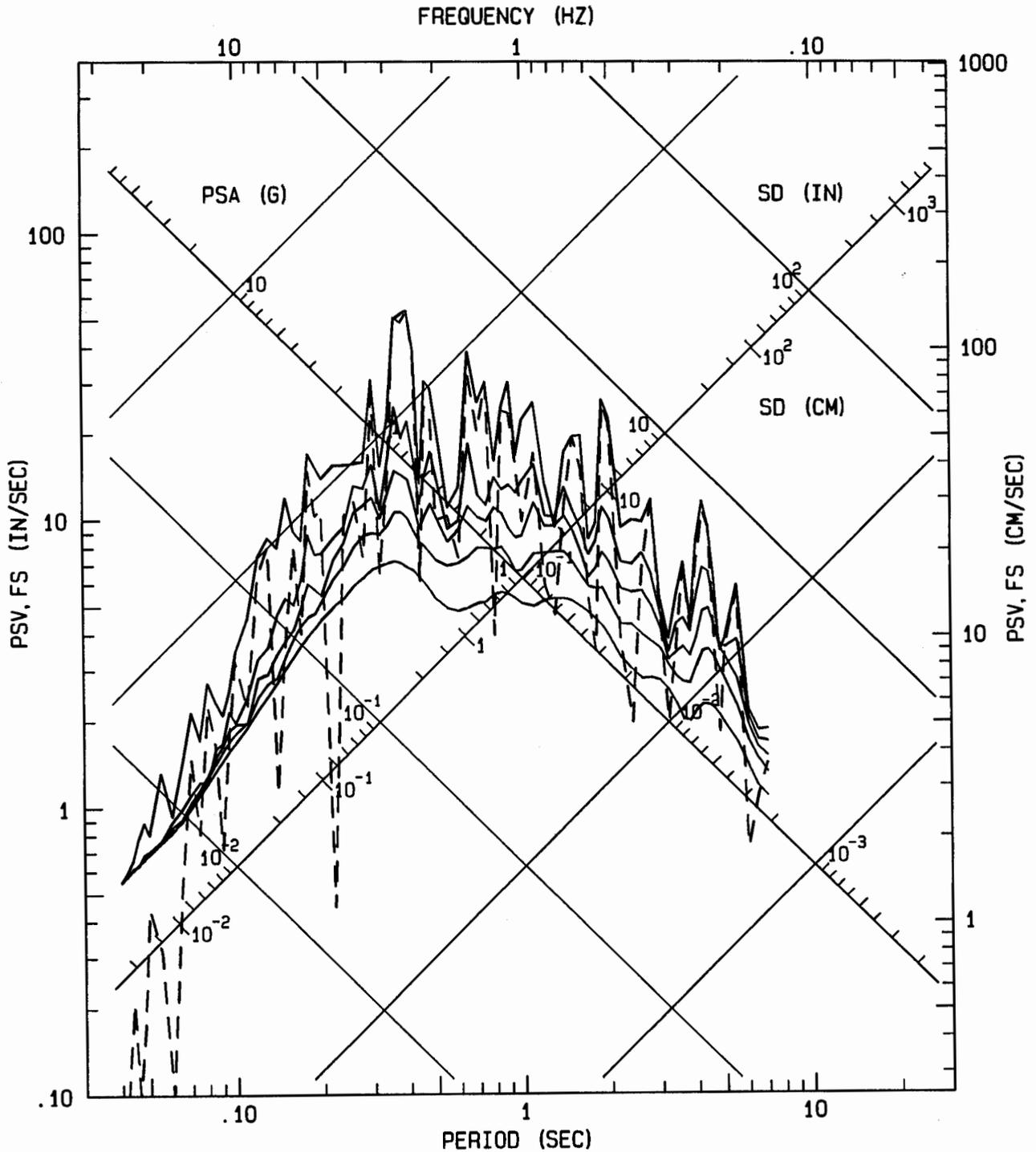
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 DAMPING VALUES: 0, 2, 5, 10, 20%



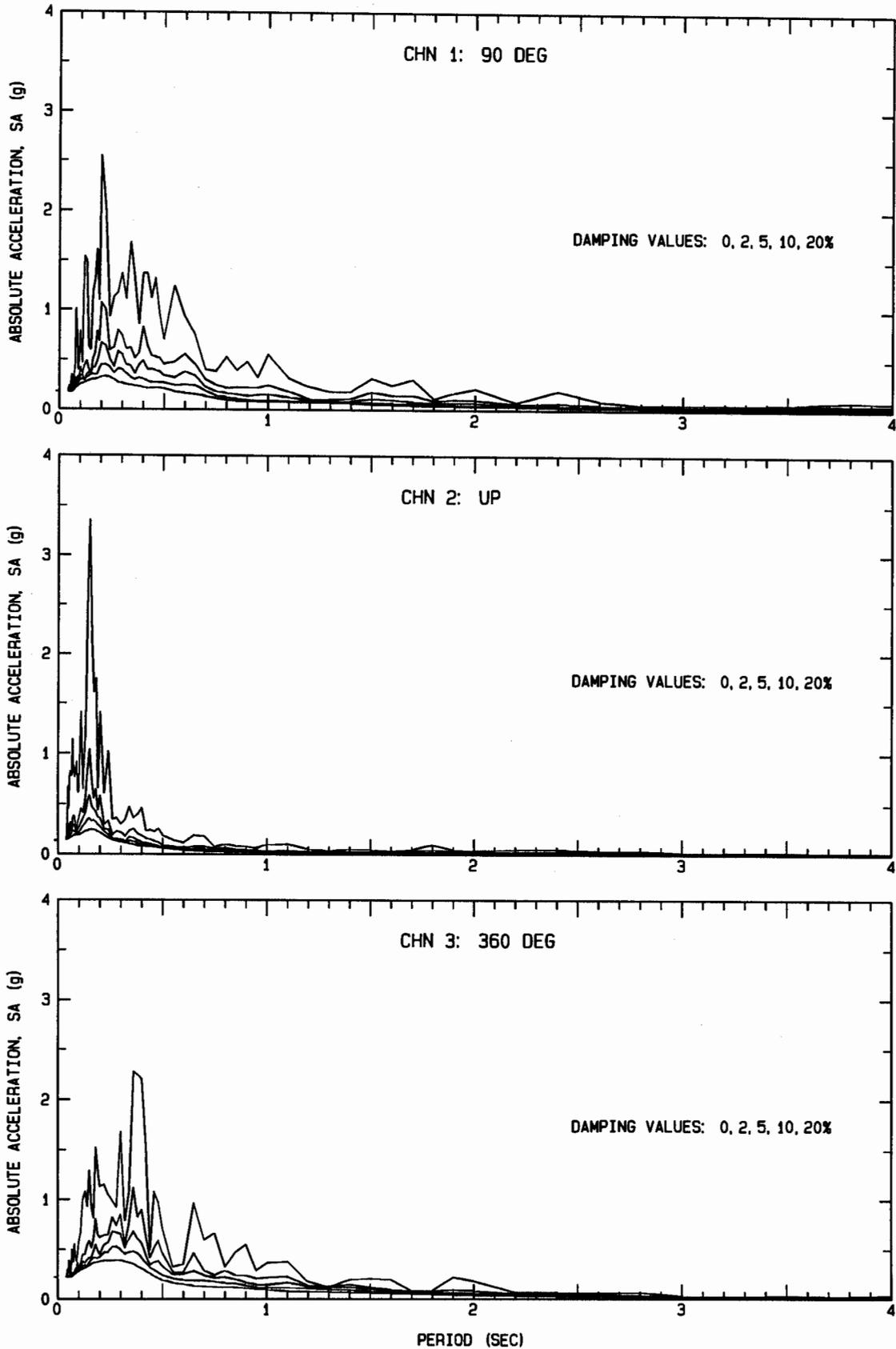
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 DOWNEY - COUNTY MAINT. BLDG.  
 CHN 3: 360 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .10-.20 TO 23.0-25.0 HZ.  
 14368-S1607-94021.02    032394.1022-QN94A368

— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



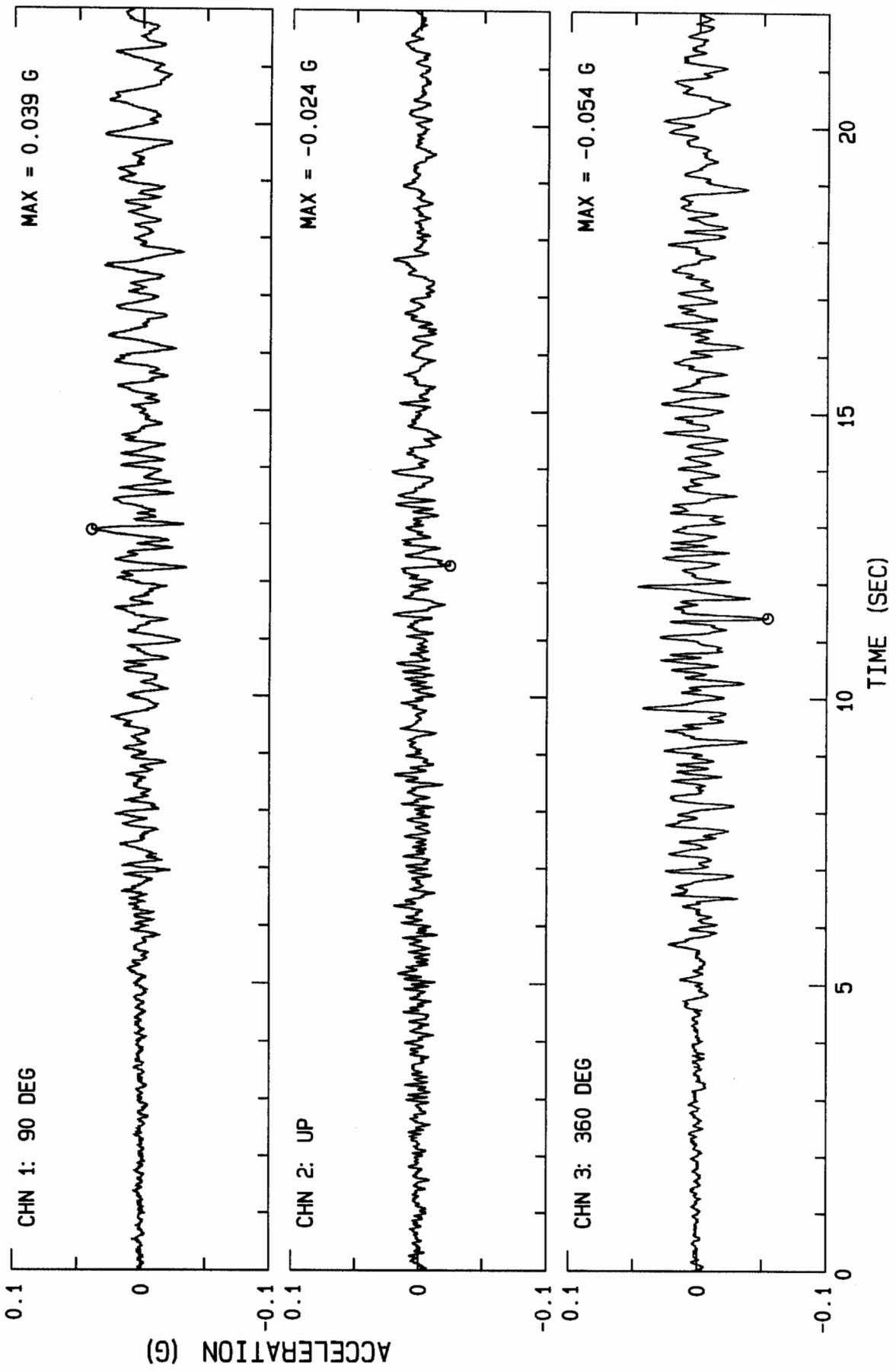
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
DOWNEY - COUNTY MAINT. BLDG.  
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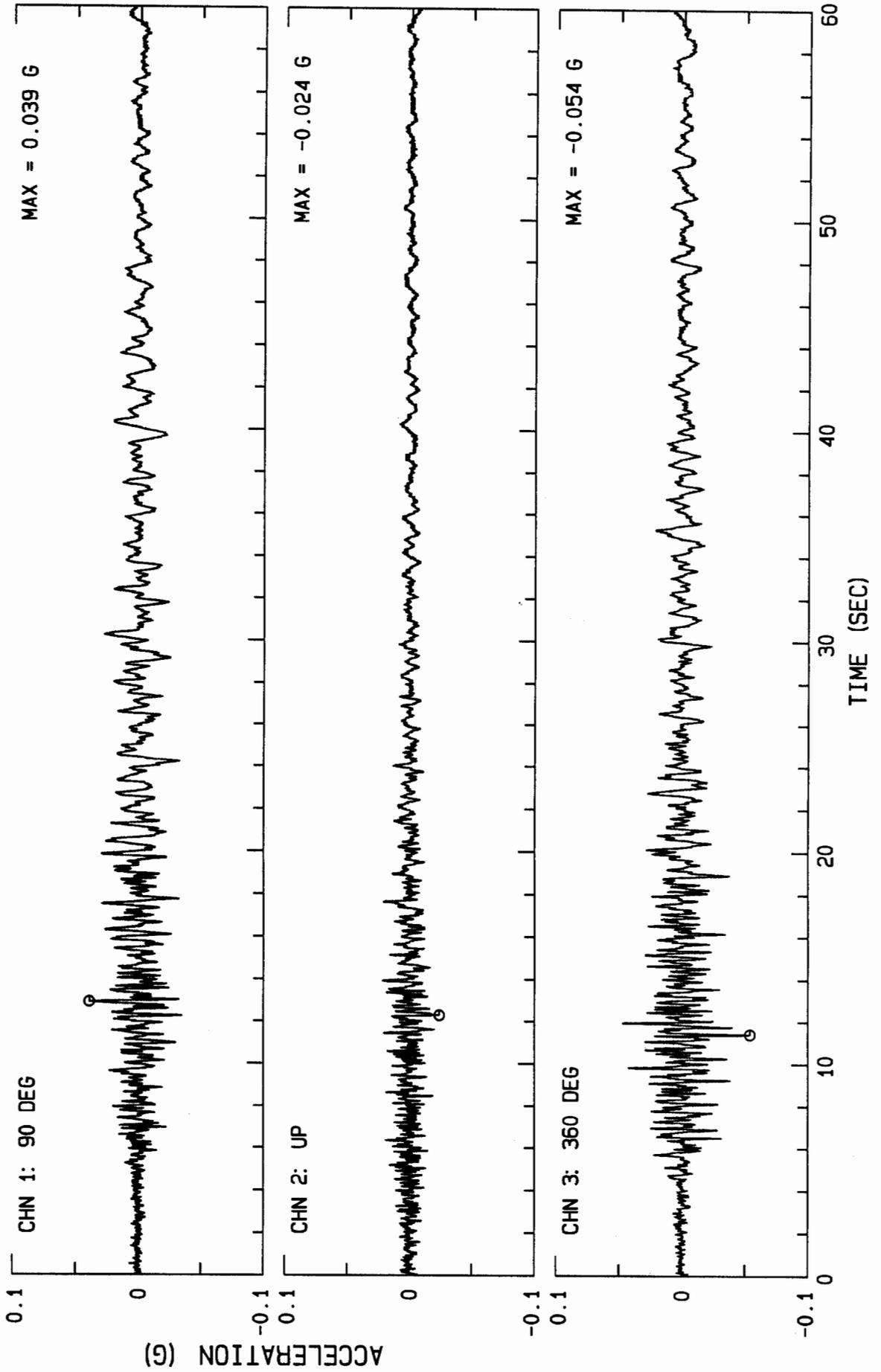


NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
LONG BEACH - CITY HALL GROUNDS

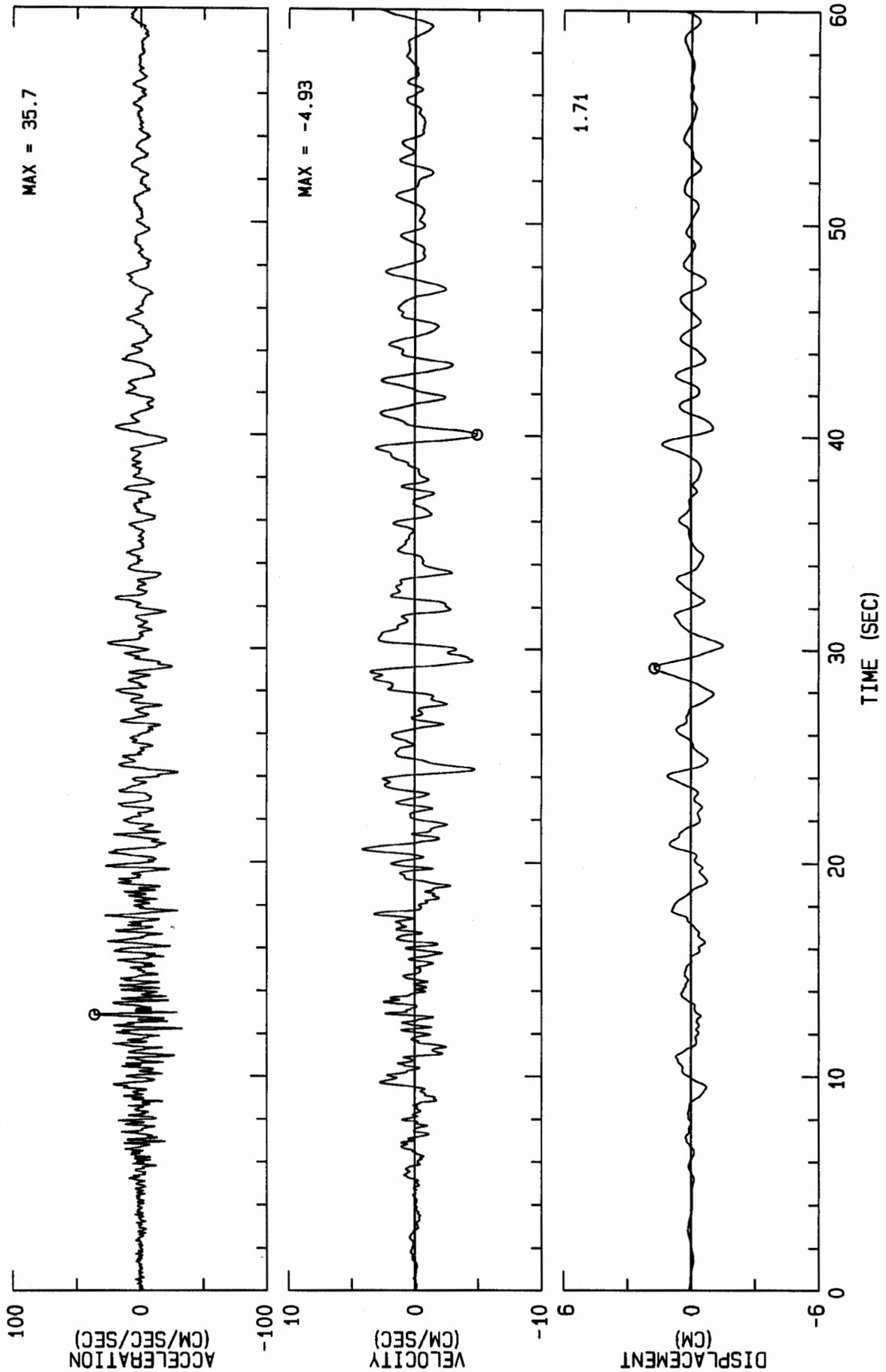
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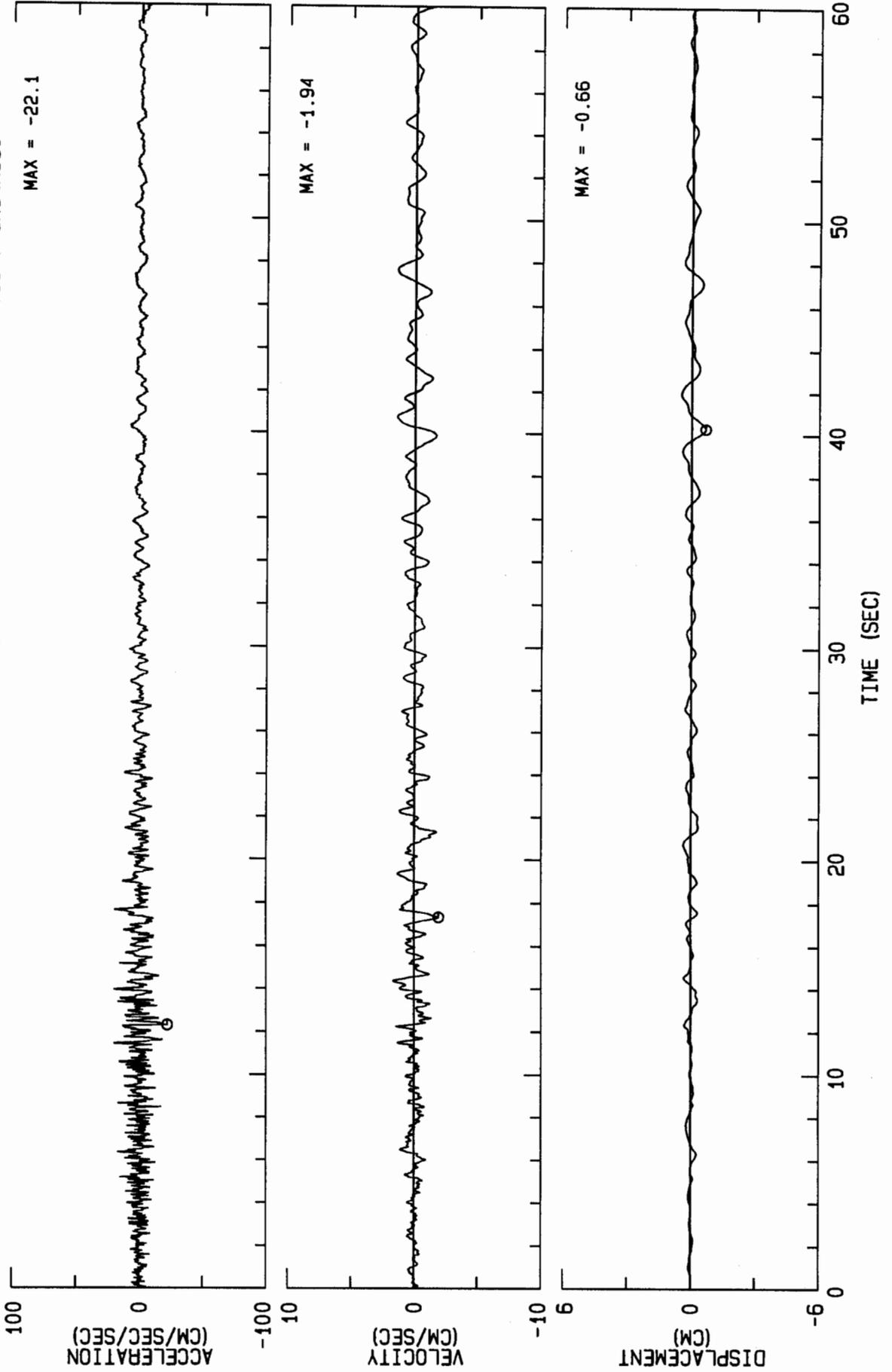
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LONG BEACH - CITY HALL GROUNDS  
UNCORRECTED ACCELEROGRAM    14560-S2615-94020.02    031494.1541-QN94A560



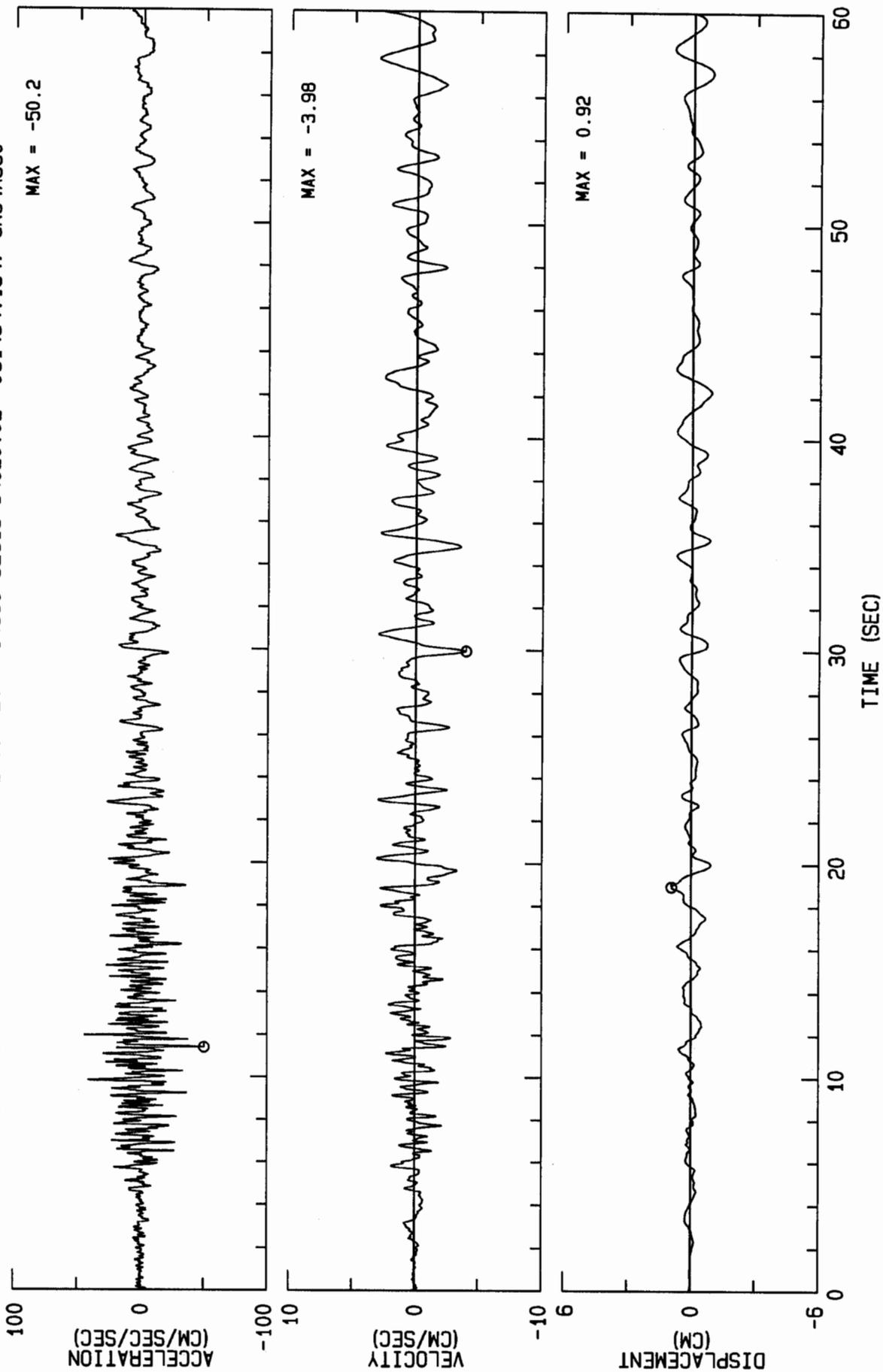
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
LONG BEACH - CITY HALL GROUNDS    CHN 1: 90 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    14560-S2615-94020.02    031494.1547-GN94A560



NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
LONG BEACH - CITY HALL GROUNDS    CHN 2: UP  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    14560-S2615-94020.02    031494.1547-QN94A560



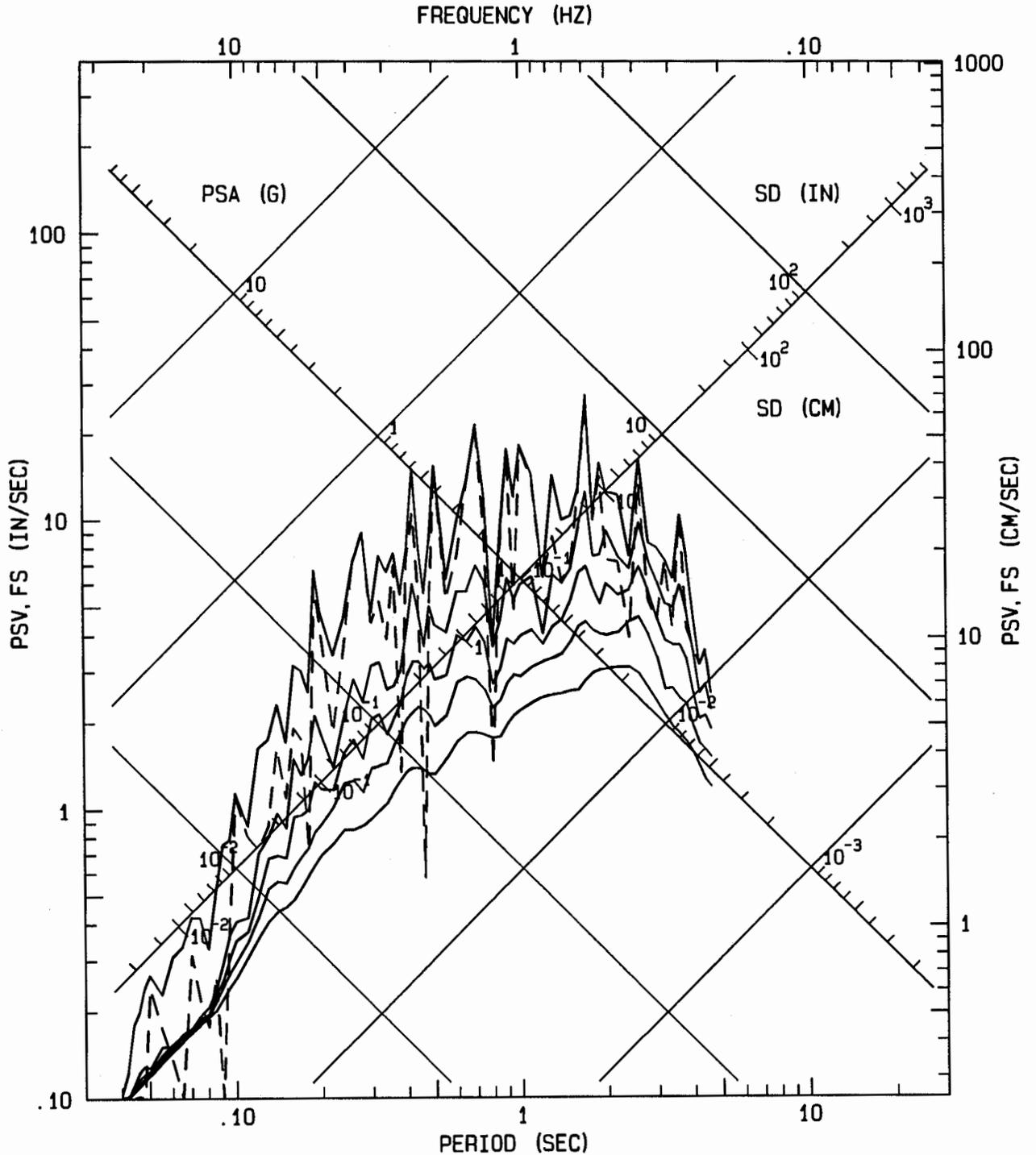
NORTHRIDGE EARTHQUAKE    JANUARY 17, 1994 04:31 PST  
LONG BEACH - CITY HALL GROUNDS    CHN 3: 360 DEG  
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT  
FILTER BAND: .15-.30 TO 23.0-25.0 HZ.    14560-S2615-94020.02    031494.1547-QN94A560



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
 LONG BEACH - CITY HALL GROUNDS  
 CHN 1: 90 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 14560-S2615-94020.02    032394.0806-QN94A560

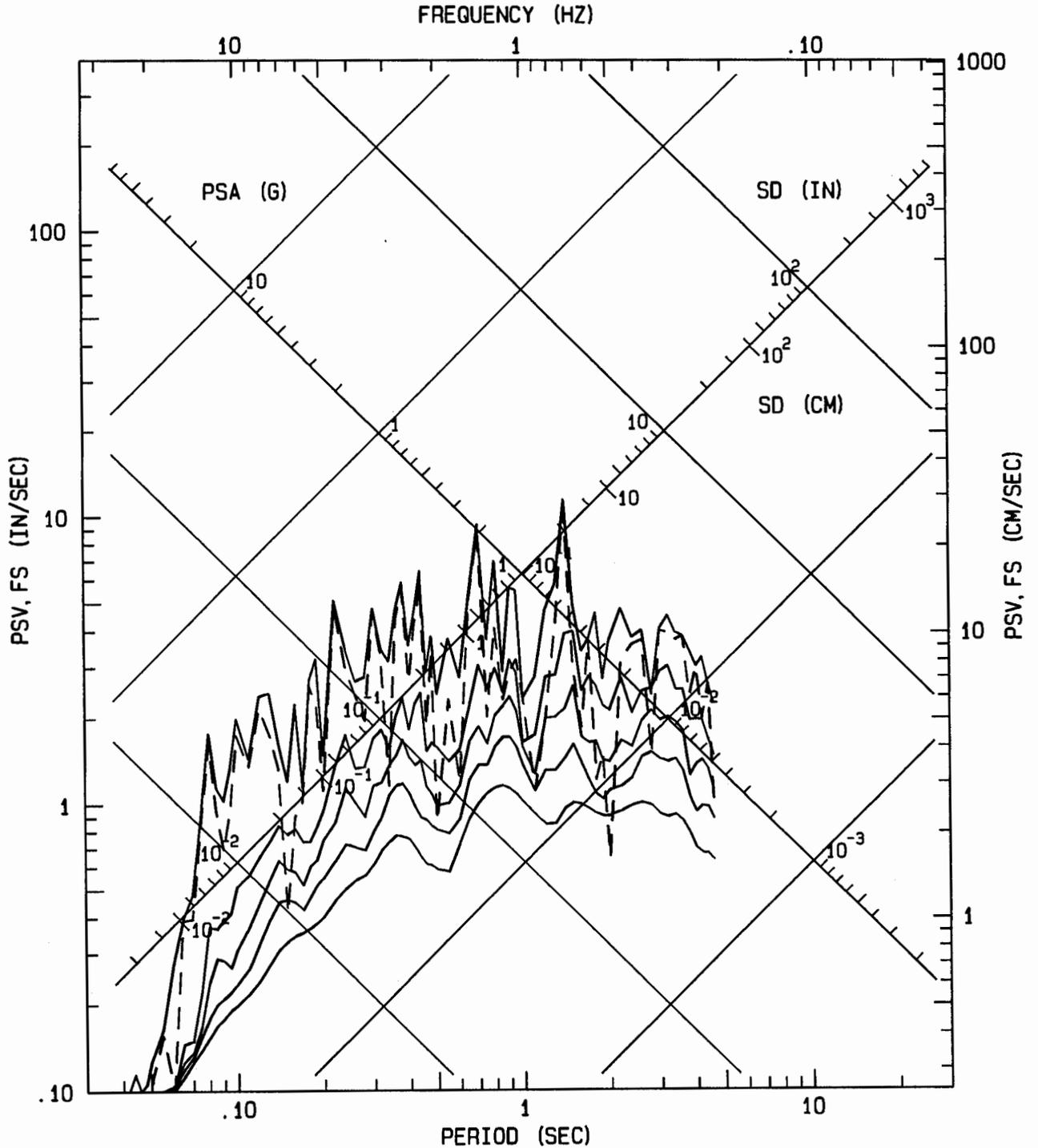
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
LONG BEACH - CITY HALL GROUNDS  
CHN 2: UP

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
14560-S2615-94020.02 032394.0806-QN94A560

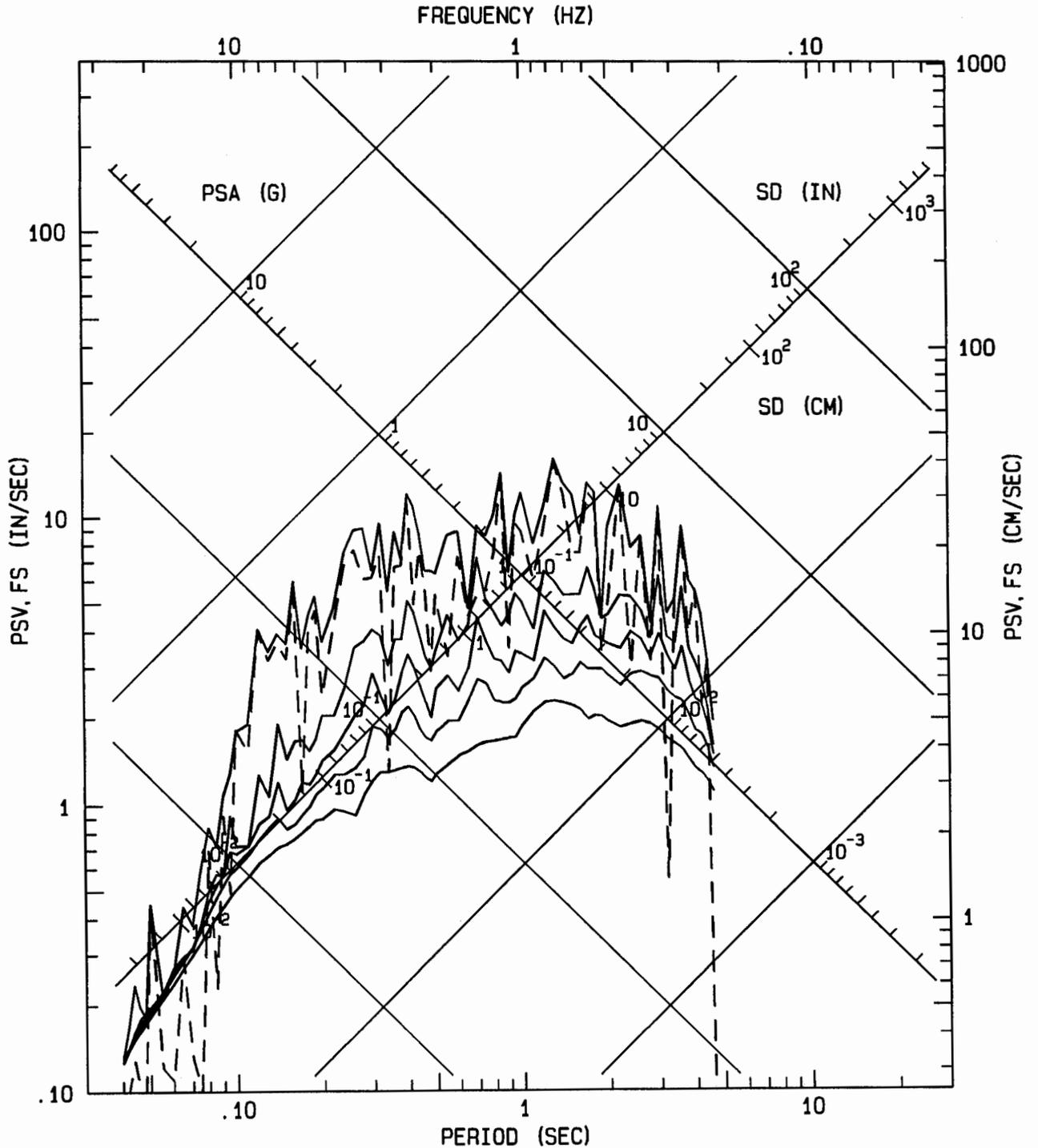
— RESPONSE SPECTRA: PSV, PSA & SD    - - FOURIER AMPLITUDE SPECTRUM: FS  
DAMPING VALUES: 0, 2, 5, 10, 20%



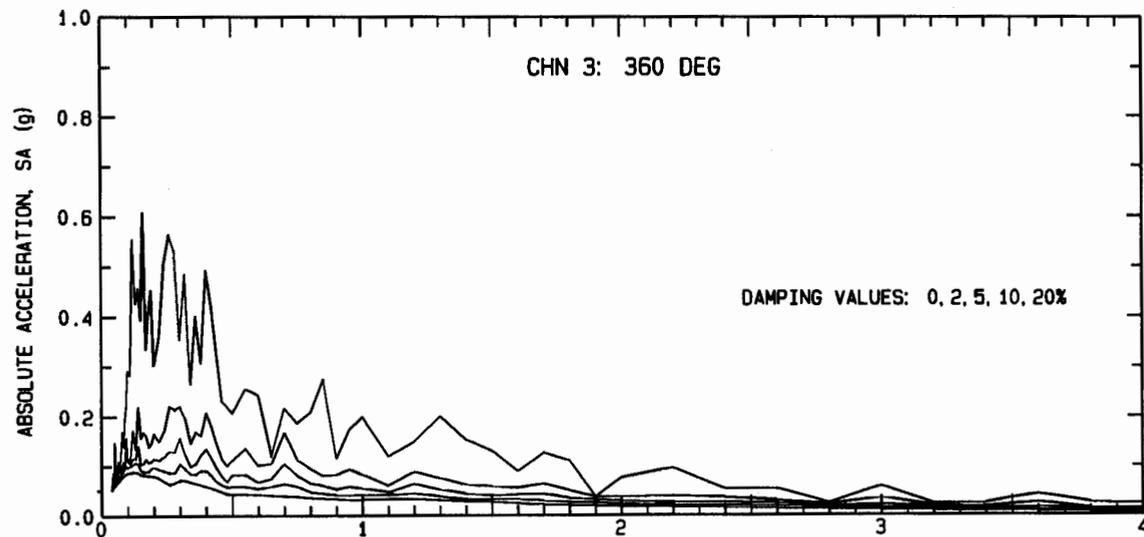
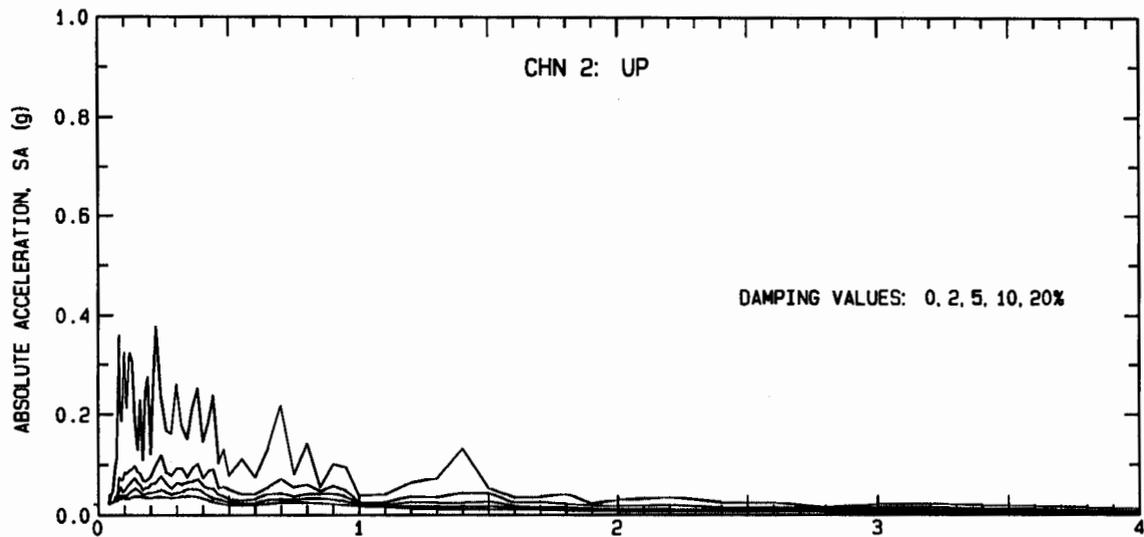
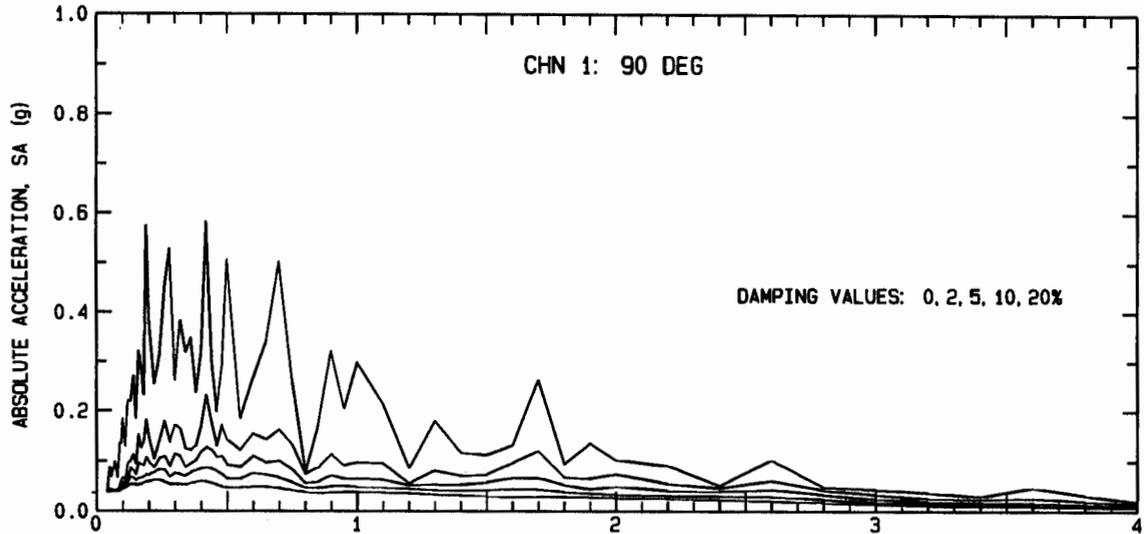
NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04: 31 PST  
 LONG BEACH - CITY HALL GROUNDS  
 CHN 3: 360 DEG

ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
 14560-S2615-94020.02 032394.0806-QN94A560

— RESPONSE SPECTRA: PSV, PSA & SD      - - FOURIER AMPLITUDE SPECTRUM: FS  
 DAMPING VALUES: 0, 2, 5, 10, 20%



NORTHRIDGE EARTHQUAKE      JANUARY 17, 1994 04:31 PST  
LONG BEACH - CITY HALL GROUNDS  
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .15-.30 TO 23.0-25.0 HZ.  
14560-S2615-94020.02    032394.0806-GN94A560



PERIOD (SEC)

